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NITI Aayog

MOVE
GLOBAL MOBILITY SUMMIT
SEPTEMBER 7 & 8, 2018

STATE/UT STRATEGIES FOR TRANSFORMING MOBILITY

A Compendium

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FOREWORD

A modern, digitized and efficient mobility paradigm is critical for economic growth. Mobility solutions in a modern economy must address the aspects of interconnectivity, environmental concerns and minimising congestion. India is very well positioned for a mobility revolution to address the challenges and tap the opportunities thrown by this major disruption being engendered by new forms of mobility.

For India, the disruptive potential of shared, connected, and zero emissions mobility can be a major engine of growth and generator of employment. Our inherent strengths in the digital economy and vast scale for mobility solutions have the potential to make India a leading source of innovation for developed and developing economies.

The Hon'ble Prime Minister's enabling vision of a bottom up policy formulation exercise is fully reflected in this Strategy compendium in partnership with the States and Union Territories of the Nation. The States and Union Territories have come up with forward looking State/UT Strategies in consultation with all stakeholders. State wide consultations and five Regional Workshops across the Nation have helped create a common platform for cooperative federalism in mobility.

NITI Aayog in consultation with knowledge partners has identified broad thematic areas and key Strategic levers for successful policy deliberations at the National and State levels. Five thematic areas, as identified by NITI Aayog, are Maximising Asset Utilisation; Electrification and Alternative Energy; Reinventing Public Transit; Logistics and Goods Transport; and Data Analytics and Mobility.

I congratulate the NITI Aayog team for bringing out this one of a kind State Mobility Strategies compendium. My thanks to the Chief Secretaries, senior officials and other stakeholders of the State task force and our knowledge partners who contributed to this document.

(Rajiv Kumar)

Place: New Delhi

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MESSAGE

Mobility has been central to humanity since the very beginning of time. The modern paradigm of Mobility has its roots in technological change, economic activities, and modal penetration and branches out to shared, connected, intermodal, seamless and green Mobility. The Government of India wants to take the idea of transforming Mobility forward as an important dimension in policy agenda, for addressing the challenges and tapping the opportunities that exist across our diversity.

Disruptive technological changes and Innovations are pillars of driving the transformational change; this includes Electric vehicle adoption, reinventing Public Transport, institutional restructuring, enabling laws among others to drive a revolution. Data driven planning, focus on multi modal systems with common mobility access, promotion of Non Motorized Transport etc. are important aspects in achieving a progressive change.

In the process of Transforming Mobility the key Strategic drivers are the State Governments and the Union Territories which are drivers of change at the very ground level. The honourable Prime Minister envisioned State led planning to drive the change, for which the State Strategies Compendium has been created comprising of all the State and UT Strategies. The States have been actively partnering in this policy exercise through various regional workshops and State level consultations.

The Government is engaging with the new technological innovations as well as the global best practices and start-ups to redefine the concept of Mobility and make it more comprehensive suiting today's challenges. The necessary stakeholder participation from Industry, Think Tanks, Academia, and Government is facilitated through landmark events like the upcoming MOVE Summit 2018.

The able leadership at the State level and Mr. Anil Srivastava, Adviser with his competent Team has resulted in bringing out this Strategy compendium. I must compliment the Knowledge partners, Stakeholders and the officials who have contributed in making this policy document. The next step ahead of us is to get the key recommendations considered as part of the planning at the National level for Transforming Mobility.

(Amitabh Kant)

Place: New Delhi

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MESSAGE

In a modern welfare State, Mobility acts as a key pillar in driving the economy forward. It serves as the lever which drives the economic activities and improves the standard of living both in Urban and Rural spheres. The new Mobility paradigm takes the deliberations beyond providing sufficient infrastructure to efficient movement of people and goods. The opportunities and solutions in this technology age are immense and an integrated vision along with thorough planning is what must drive the holistic agenda ahead.

NITI Aayog is encouraging the adoption of transformational Mobility as a key Policy Agenda. This policy exercise revolved around the true nature of cooperative federalism through multiple consultations, workshops and a series of communication to bring all the partner States and Union Territories together. State wide consultations and video conferences were carried out with all 29 States and 7 UTs throughout June to enable the formation of State Task Forces on Mobility and present the comprehensive thematic areas and strategic levers to federal units. An orientation workshop was also conducted at NITI Aayog with senior officials comprising of Chief Secretaries and Secretaries of the State governments to facilitate the strategy formulation at the State/UT level.

Over the course of July and August five regional workshops at Delhi, Ahmadabad, Bangalore, Kolkata and Guwahati were organised for States to discuss the outline of their strategy papers and attain regional synergies. An indicative template for State mobility strategies was evolved based on discussions to facilitate States in formulation of strategies.

I would like to thank the senior leadership of our Vice Chairman and CEO for providing us the vision and support to carry out this exercise. I would like to congratulate the State and UT officials for coming up with respective strategies in this short span of time. This document is the result of diligent efforts and sincerity on the part of my team and the knowledge partner to put it together as a compendium.

The next step ahead of us is to get the key recommendations and preferences that emerge out of the State/UT strategies incorporated at the National level for transforming mobility in the country.

(Anil Srivastava)

Place: New Delhi

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एक कदम स्वच्छता की ओर

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Introduction

Mobility solutions are important to connect people to jobs, education, health care and various recreational activities and connect goods to markets. Mobility is important for economic growth of a region as clearly pointed by NITI Aayog *"If cities are the "Engines of Economic Growth" its mobility systems are the "wheels of that engine""*. In India, between 1981 and 2011, , the number of vehicles has increased by 25.3 times against the population growth of 1.77 times[1] indicating increasing economic status of people along with increasing need for comfortable mobility solutions. However, this increase in number of vehicles has also led to increase in congestion in the cities. Increasing congestion is expected to cost USD 14.7 billion per annum by 2030 for New Delhi alone. This includes cost of productivity loss, cost of pollution, and fuel wastage[2]. Today, new technologies and business ideas are disrupting the traditional mobility solutions across the world. These are helping cities to provide clean, sustainable, affordable and comfortable mobility solutions.

With this context, NITI Aayog is hosting the first Move Summit in New Delhi where stakeholders from various sub-sectors of mobility and transport will gather to co-create a public interest framework to revolutionize transport. The vision statement defined by NITI Aayog on mobility is "To seamlessly provide **inter-modal, shared, clean, connected, inclusive, safe**, and **economical** transport to citizens across urban and rural areas". With this in mind, NITI Aayog conducted a national workshop on 28 June 2018 with all states and Union Territories to achieve a common understanding of the principles of transformative mobility and enable dialogue on state, regional and national level strengths, challenges and opportunities on mobility.

During the summit, NITI Aayog proposed the following levers as drivers for Mobility Vision : Shared mobility; Intelligent Transport Solutions and Digitization; Zero Emission Mobility and Renewable Energy Sources; Non-motorized Transport and Inclusive Mobility; Freight Movement; Mobility Financing & Entrepreneurship; Rural Mobility & Farm Logistics; Skilled Manpower; Advanced Manufacturing, and Cyber/ Data Security & Safety Mechanisms. NITI Aayog also proposed six themes for developing a mobility strategy viz.

- Maximum asset utilization
- Comprehensive electrification
- Alternative fuels
- Re-inventing public transport
- Logistics and Goods transport
- Data analytics and mobility

With this, NITI Aayog also requested states to outline their strategies on mobility solutions. This would help in making a coherent policy on transformative mobility in the country. This document contains the strategy documents shared by the states.

[1] State Task Force Orientation, Strategy for Transforming Mobility, NITI Aayog June 28, 2018. http://movesummit.in/files/StateTaskForceOrientation.pdf

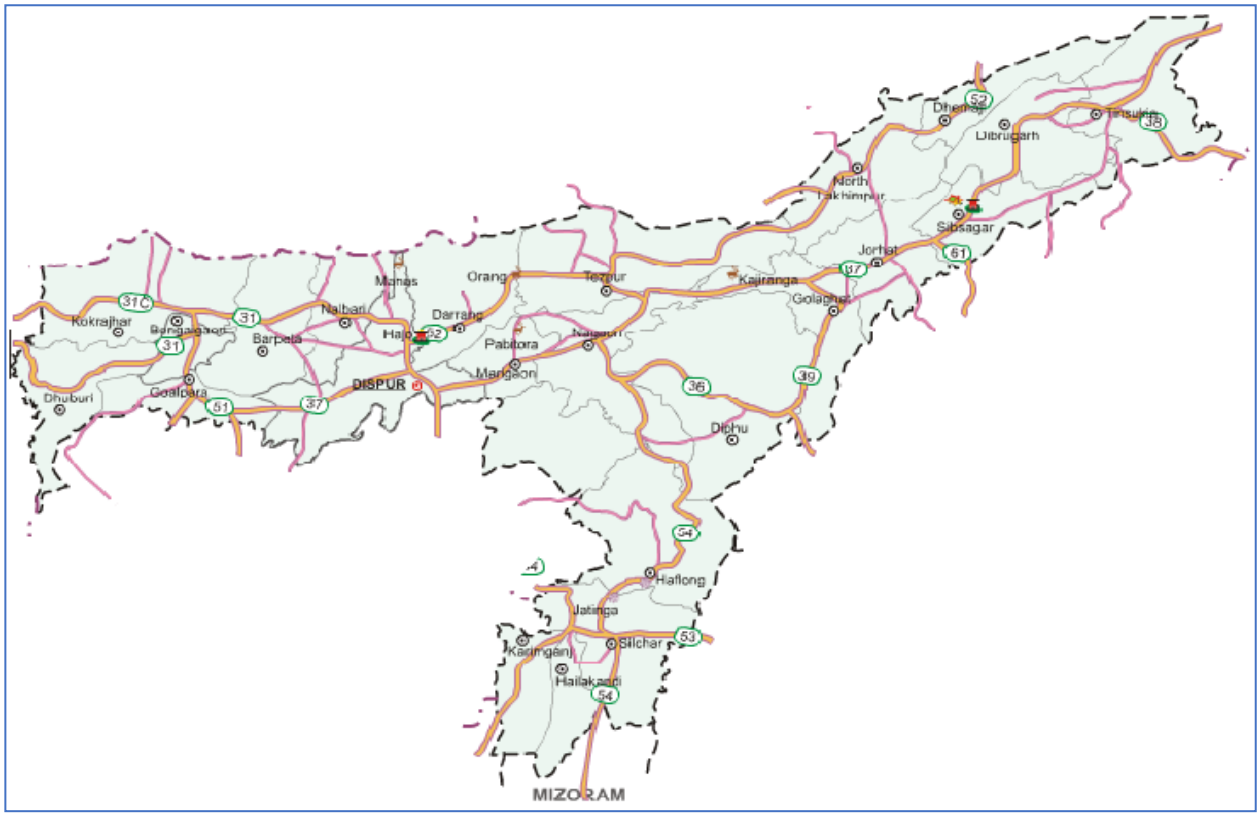
[2] Neema Davis, Harry Raymond Joseph, Gaurav Raina, Krishna Jagannathan, "Congestion costs incurred on Indian Roads: A case study for New Delhi",

ASSAM

INTRODUCTION

Assam is one of the fastest growing States in East India with a population of 3.12 crores (Census, 2011). Located in the northeast of India, Assam shares its borders with the states of Arunachal Pradesh, Nagaland, Manipur, Mizoram, Meghalaya, Tripura and West Bengal. Additionally, the state shares international borders with Bangladesh and the Kingdom of Bhutan. The state is also an increasingly popular destination for wildlife tourism. With its five national parks and eighteen wildlife sanctuaries, the state is a biodiversity hotspot.Assam has adopted numerous investor-friendly policies to attract investments and accelerate industrial development. Key areas of focus include Information technology (IT), tourism and power sector along with several other initiatives such as the Industrial and Investment Policy 2014. Assam ranks 17th among Indian states in ease of doing business and reforms implementation, according to study by the World Bank in 2018.

MOBILITY AND URBANIZATION



As per the Census 2011, Assam has the largest urban population of 4.3 million, amongst the North-eastern States. The population of Guwahati city is 9.6 lakh and that of Guwahati Urban Agglomeration is 9.7 lakh (Census of India, 2011). Guwahati, the political and commercial nerve-center of Assam, is the largest urban agglomeration in the State and acts as a vital link for connectivity with the Northeast as well as the larger Southeast Asian economy.

The population density of Guwahati as per Census 2011 was 4,444 persons per sq. km and has grown rapidly in the previous years. In view of the increasing trend in population coupled with inequitable growth in the city infrastructure and road network, congestion on road network has emerged as a severe problem in the city, especially during peak hours.

Road Transport

In recent years, the growing use of personal motor vehicles in Assam has contributed to traffic congestion, poor air quality, declining public health, road fatalities and social segregation. As per the comprehensive mobility plan (CMP) for Guwahati, the modal share of public transport is 8% where as that of private vehicles is 48%. This clearly shows a high degree of dependence of people on private vehicles. Personal motor vehicle-oriented infrastructure, such as road widening, elevated roads and multi-storey parking, offer at best short-lived improvement in traffic conditions, and are insufficient to meet the growing mobility needs of Assam.

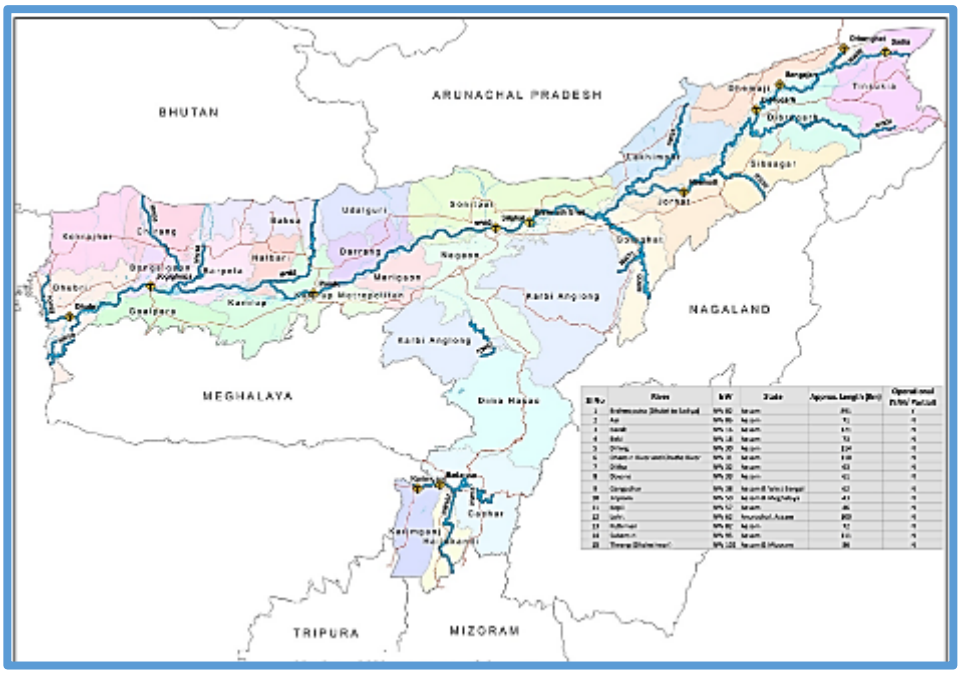
Inland Water Transport

Assam has the largest inland waterways network in India. Assam's navigable inland waterways extend to 1,983 km out of India's total 14,544 km comprising of 44 rivers.

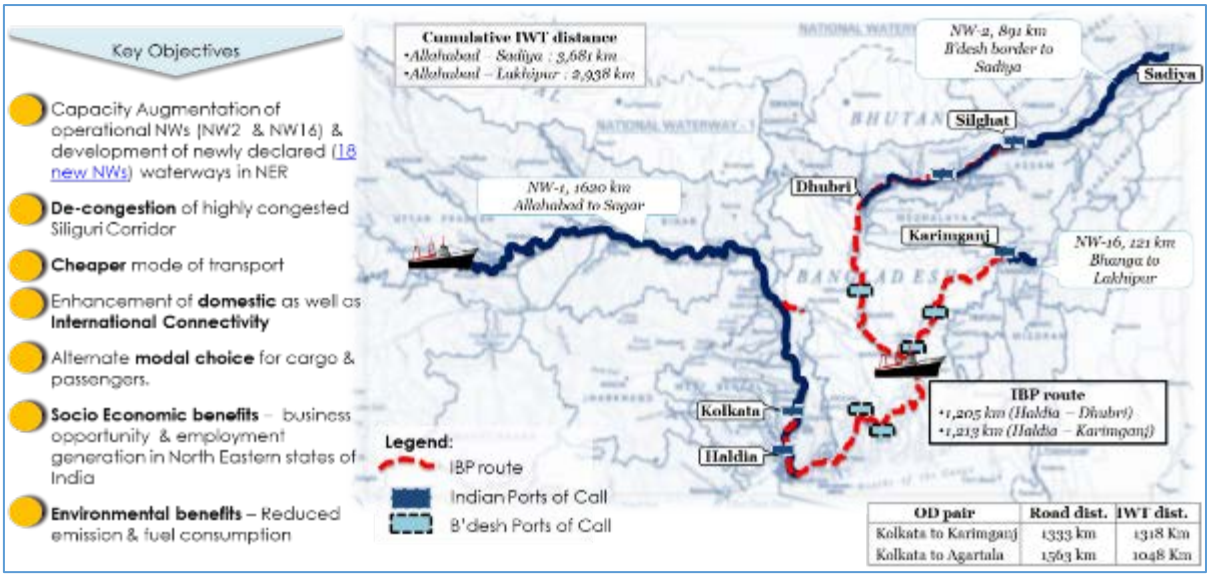
The IWT's share of passenger traffic is expected to increase from an estimated five to fifteen percent in the next 3 years (2018 – 2021). The National Waterway 2 (NW-2) comprises of 891 kilometers of the River Brahmaputra and the National Waterway 16 (NW-16) comprises of 121 kilometers of the River Barak. Currently 104 nos. of notified ferry services (routes) are operational on the Brahmaputra and Barak valley under the Department of Inland Water Transport.

An additional 13 tributaries in Assam have been upgraded as National Waterways recently. These are NW 06: Aai, NW 95: Subansiri, NW 38: Gangadhar, NW 18: Beki, NW 30: Dehing, NW 32: Dikhow, NW 82: Puthimari, NW 57: Kapili, NW 31: Dhansiri, NW 33: Dayans, NW 50: Jinjiram, NW 62: Lohit and NW 102: Tlwang.

In addition to the passenger traffic, IWT also caters to about four percent of the total freight tonnage movement to and from the state.



Proposed Port Connectivity in Assam under IWAI & IWT

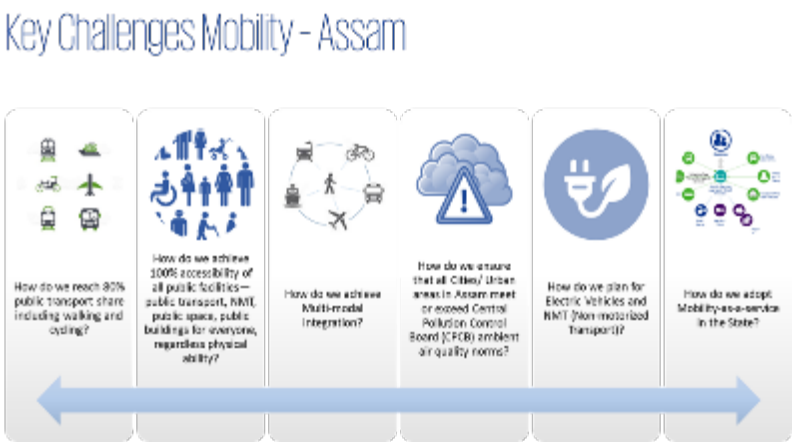


Civil Aviation

Assam has six operational airports in Guwahati, Dibrugarh, Jorhat, Lilabari, Silchar and Tezpur. The Airports Authority of India (AAI) plans to develop Guwahati as an inter-regional hub. The Lokpriya Gopinath Bordoloi International (LGBI) Airport here has been ranked as the eight busiest airport in the country in 2018. According to available data with the AAI, in the financial year 2017-18, the airport witnessed a footfall of 46,68,053 passengers, with a total of 41,172 aircraft movement, making it the eighth busiest in the country. In addition to domestic connectivity with the northeastern states, Guwahati is currently connected to Bangkok and Paro airports. The expansion and upgradation of the Lokpriya Gopinath Bordoloi International (LGBI) Airport is currently underway.

Under the 'Ude Desh ke Aam Naagrik' (UDAN) scheme, efforts are underway for connecting Guwahati to key airports in the region, both domestic and international.

The mobility needs of the State is expected to grow rapidly in the next 10 years. Technological innovations in the form of electrification, connectivity, and autonomy also allows us the opportunity to reset the primary relationship between the car & citizen in the State. An integrated mobility perspective is critical for key stakeholders in the State for moving people and goods in an efficient and sustainable manner.



STATE MOBILITY INTERVENTIONS (BEST PRACTICES)

Several innovative initiatives have been undertaken in the State by key stakeholders to enhance travel experience for citizens and usher in improved transparency:

1 Online Reservation system to enable citizens to pre-book their tickets through third party vendor portals using many modes of payment and thus encouraging cashless transactions

2 Procurement of Electronic Ticketing Solution in Buses on revenue sharing model is in progress. The initiative includes installation of ETM machines, Vehicle Tracking devices, Command Centre, Mobile app based ticketing.

3 Initiatives are ongoing under the UDAAN scheme to connect Guwahati with the major international hubs such as Dhaka, Kathmandu, Kuala Lumpur, Yangon, Singapore and Bangkok.

4 The Lokpriya Gopinath Bordoloi International (LGBI) International Airport is slated to receive its second cargo terminal to cater to a rise in cargo movement to and from the Northeast. The plan for cargo complex includes the scheme for enhancing the air cargo capacity of the airport to 12,000 MT annually.

5 Introduction of “Water Taxi” service for reliable and prompt longitudinal ferry service to augment the road transportation network is proposed to be introduced on the basis of demand availability. Implementation of ‘Water Taxi’ service will significantly improve the IWT infrastructure ensuring passenger safety, tourism development, environment friendly mode and employment generation.

6 Upgradation of the Inter State Bus Terminus (ISBT) at Guwahati to world class standards is currently under progress

7 The IWT Jogighopa Terminal is proposed to be developed in collaboration with Inland Waterways Authority of India (IWAI), with modern Jetty and Cargo handling facilities and containerization infrastructure. The IWT terminal at Jogighopa has the potential to emerge as a major hub for cargo movement through waterways, increasing international trade through Bangladesh and facilitating bilateral trade between Bhutan and Bangladesh. It has the potential to be a regional multimodal transport hub, which can suitably serve other states of NE region, especially Meghalaya and areas of North Bengal.

8 Ro-Ro service between Dhubri and Hatsingimari, having a total waterway length of 29 KM is operational. This initiative paves the way for drastically bridging the distance and cost for cargo and passenger movement between Dhubri and Hatsingimari which shares its border with Meghalaya. 1 Ro-Ro (8 Truck capacity) vessel is under construction and is Likely to be delivered by Aug 2018 for Neamati-Kamlabari Route

9 Multi-level car parking facility has been operationalized within the ASTC depot premises leading to improve parking management and enhanced revenue generation

10 The USD 150 million World Bank supported project for enhancing passenger Ferry services has been taken up. Its aim is to upgrade the current terminal infrastructure & vessel fleet. This will improve the last mile connectivity.

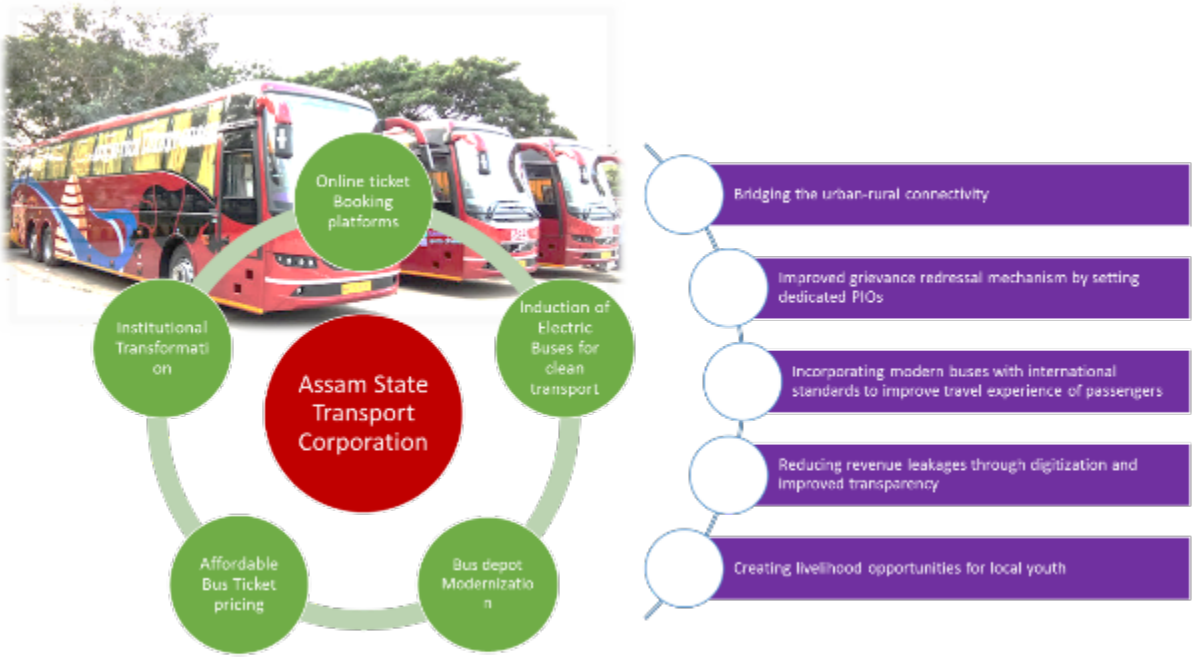
11 Four ports have been identified to act as immigration checkpoints - Silghat, Pandu, Karimganj and Dhubri

12 An incentive scheme named ‘Jibondinga’ is proposed to be launched for secure & sustainable ferry service which will also encourage private ferry operators to register. Incentives on women led startups / self–help groups is also considered under the scheme.

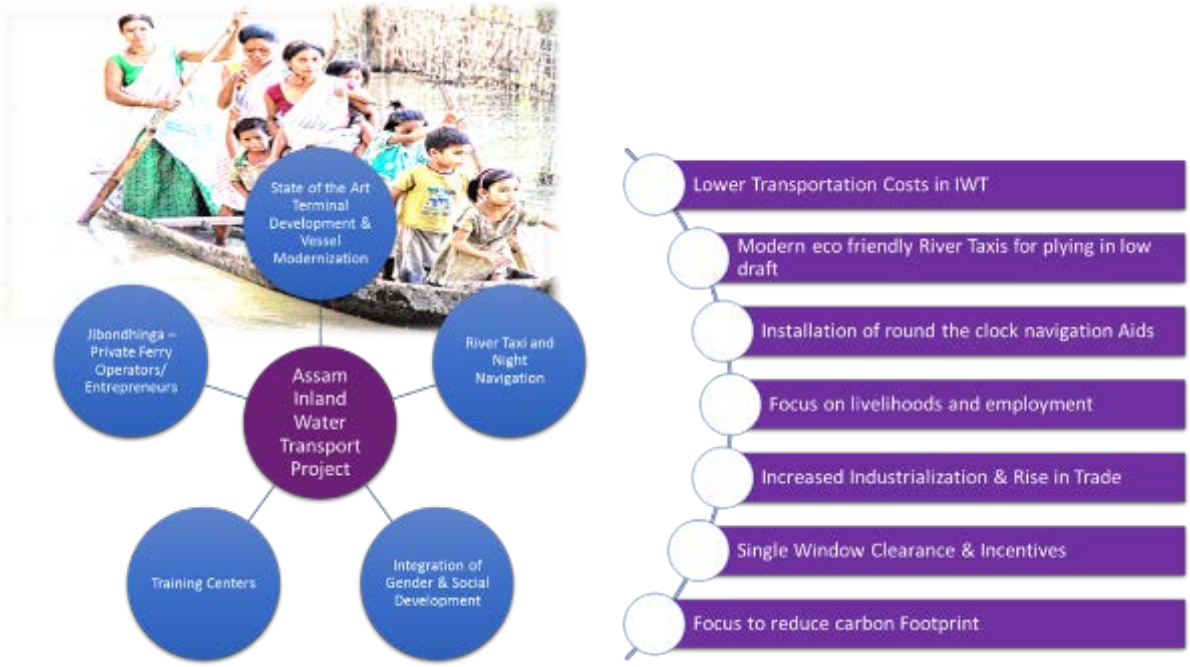
13 Non-operational/ redundant buses have been refurbished for use as market-on-wheels

14 Procurement of electric buses on Gross Cost Contract (GCC) model

15 Enhancing rural connectivity by launching 400 additional buses to connect remote villages with towns.



Correspondingly, the Directorate of Inland Water Transport (IWT) has undertaken key initiatives to augment inland water transport services in the state:



Assam Inland Waterways - Key Outcomes

VISION 2030

"Towards greater accessibility, efficient mobility and low carbon future"

Assam State Mobility Strategy - Key Principles

MISSION

In order to achieve the stated vision, Assam government will focus on the following objectives and roll out the strategy in a phased approach -

1 Remodeling STA/ RTA as a dedicated unified metropolitan transport authority (UMTA) in the State

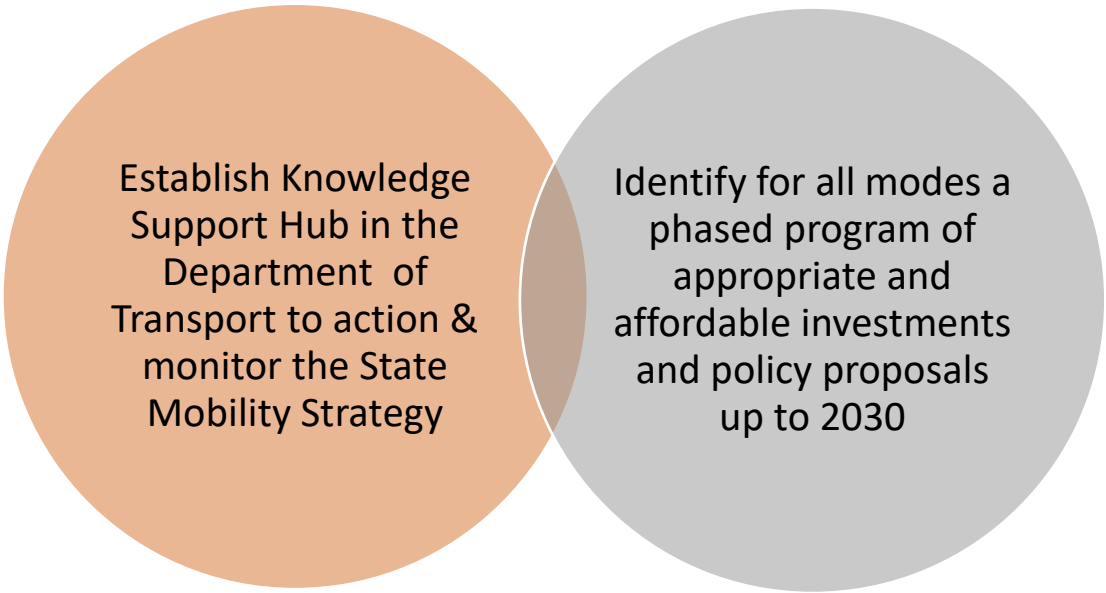
2 Encourage low emission transit-oriented development

3 Regulate growth of personal motor vehicles & management of commercial goods vehicles including parking, through travel demand management

4 Prioritize walking, cycling and public transport (Surface & IWT)

5 Promote universal accessibility for all public including women, children, elderly, physically challenged at all the public spaces

6 Improve Regional and Rural Connectivity to enhance economic and social activity.



SUSTAINABLE MOBILITY STRATEGY

Sustainable Development Goals (SDGs) aim towards sustainable mobility: SDG #11 simultaneously facilitates the reduction of air pollution (and, by association, health problems) as well as economic activity through the efficient movement of workers and increased social interaction.

Effective public transport systems enable compact cities that would limit land consumption (another target of goal #11) while imaginative urban design and provision of green space could positively influence biodiversity in cities and elements of human health and well-being.

Mode of Transport
Bus (Public & Private)
Train
Ferry
Taxi
Car (private owned)
Auto
Rickshaw
Scooter/Bike
Bicycle
Truck/Lorry

Problems in Movement
Lack of road/rail/water channels for movement
High traffic congestion
Difficulty in finding Parking spaces
Lack of on-demand/time availability
Safety concerns
Affordability
Time-taking

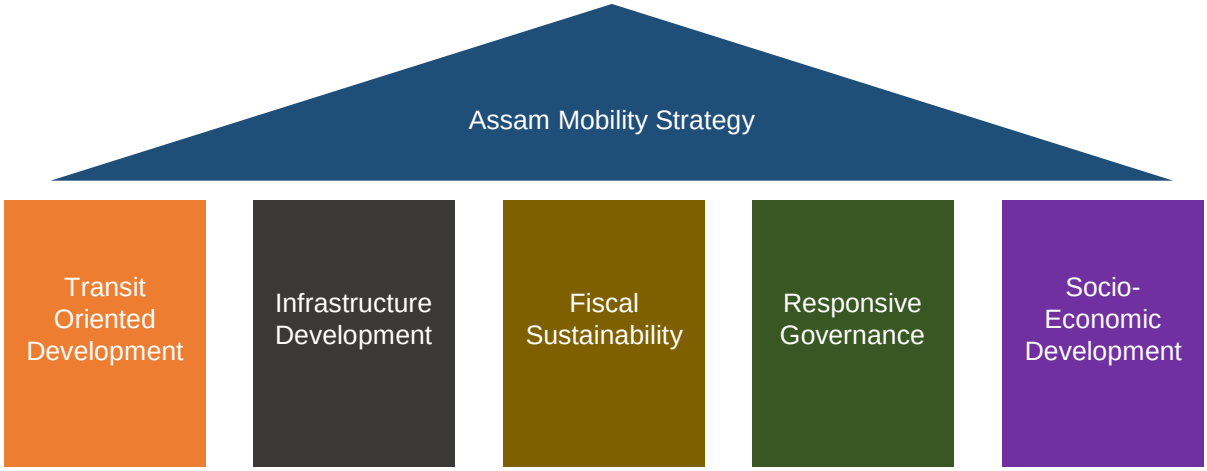
Reason for Movement
Office/College-Home daily travel
Goods movement
Service Delivery
Vacation/Holiday travel
Shopping travel

With an intent to provide convenient, accessible, affordable and eco-friendly mobility solution, the integrated mobility strategy endeavours to strengthen legal /regulatory framework, adopt technologies and designs that improve travel efficiency and incentivize citizens to move towards public mode of transport.

The state of Assam, aims to be a model for low-impact carbon neutral development using innovations in transportation and green infrastructure that self-sustain financially & economically.

Supporting Pillars of Strategy –

The Assam Mobility Strategy is built on 5 strategic pillars:



These together provide the foundation for creating an inclusive, resource-efficient, and technology enabled future for the state mobility.

Transit Oriented Development

a) Proper route scheduling to integrate metro, bus, ferry services in-line with airport and railway arrival-departure schedules

b) Efficient segregation of freight and passenger traffic movement to reduce peak-time congestion

c) Integrated payment system across all modes of transport to enable hassle free cashless movement of passengers

d) Incentivize car-pooling services to increase asset utilization and promote e-rickshaws to provide end-mile connectivity.

e) Enhanced safety and accessibility of public transport for women, children, elderly and physically challenged individuals

2) Infrastructure Development

a) Develop Metro line that connects key economic nodes in the state.

b) Establish state-wide charging infrastructure to meet the charging requirements of electric run buses, ferries, cabs, e-rickshaws

c) Update State Master Plan to incorporate design that encourage movement of non-motorized vehicles and pedestrians

d) Make the Fleet ICT enabled and incorporate enhanced traffic management system

Fiscal Sustainability

a) Encourage Public-Private Partnerships for effective and efficient execution of projects

b) Incorporate technology to streamline processes and generate reports that enable management to take informed decision while making investment decisions.

c) Identify non-operational means of revenue sources such as (advertising/co-branding, leasing/renting of under-utilized assets) and utilize the receipts to meet the operational expenses.

d) Use of SPV and Revenue sharing models where-ever necessary to share the risks among the stakeholders and execute projects with minimum investment from the state

Responsive Governance

a) Remodel STA/ RTA as a dedicated unified metropolitan transport authority (UMTA) in the State

b) Establish Integrated Command and Control center which monitors and co-ordinates traffic movement forthe designated areas within the state.

c) Establish Grievance redressal units that attend and resolve public concerns related to transport.

d) Create a single window clearance system across transport department of Assam to enhance ease-of-doing business.

Socio- Economic Development.

a) Develop specially designed buses that enable farmers to carry agri-produce from villages to the near-by markets.

b) Provide employment opportunities in the transport department for skilled youth

c) Fare policy for public transport will be prepared considering the travelling needs of rural population .

ACTION PLAN

The pillars that support the strategy are compartmentalized into 5 broad projects namely-

1. Institutional Improvements
2. Electrification of Public Transport
3. Urban Mass Transport Development
4. Promotion of Non-motorized Transport (NMT)
5. Emission Control Measures

The above identified measures is proposed to be rolled-out in 3 phases as shown in the matrix below -

	Institutional	Electrification of Public Transport	Urban Mass Transit	Promotion of NMT	Emission Control
Phase 1 (2019-21)	1) Set-up State Nodal Authority to supervise the State Mobility Plan 2) Define roles and Responsibilities of the Nodal Agency	1) Regulatory Policy to incentivize private electric vehicle aggregators for both surface and water transport 2) Procure Electric Fleet - Buses, Rickshaws, Cabs, Ferries	1) Update Master Plan to include Transit Oriented Development	1) Regulate passenger & freight movement 2) Plan Dedicated Pedestrian Facilities 3) Enhanced city-wide signages	1) Monitoring of Vehicle health check process 2) Introduce CNG for greener public transport 3) Complete digitization of vehicle registration process
Phase 2 (2022-26)	1) Dedicated State Mobility Fund for infrastructural/ technological improvements	1) ICT enabled Public Transport 2) Command Centre for Integrated Monitoring/ Surveillance	1) Metro Infra Plan and Designing 2) Land Acquisition Plan for Metro development	1) Identify and plan corridors for improved access to pedestrian and NMT vehicles 2) Critical Junction / Node Improvement Plans	1) Monitoring of City Pollution Maps through distributed sensors 2) Congestion Charging & last mile connectivity
Phase 3 (2027-30)	1) Integrated payment system across all modes of transport	1) Integrated Transport Management System to streamline traffic flow	1) Route Scheduling to Integrate Metro Schedule with bus, ferry and other modes of transport	1) Develop dedicated lanes to encourage walking and cycling	1) Integrated Parking And Travel Demand Management

Institutional Establishment

a) Phase 1 (2019-21)

- Set-up State Nodal Authority to supervise the State Mobility Plan
- Define roles and Responsibilities of the Nodal Agency

b) Phase 2 (2022-26)

- Dedicated State Mobility Fund for infrastructural/ technological improvements

c) Phase 3 (2027-30)

- Integrated payment system across all modes of transport

Electrification of Public Transport

a) Phase 1 (2019-21)

- Regulatory Policy to incentivize private electric vehicle aggregators for both surface and water transport
- Procure Electric Fleet - Buses, Rickshaws, Cabs, Ferries
- Command Centre for Integrated Monitoring/ Surveillance

b) Phase 2 (2022-26)

- ICT enabled Public Transport

c) Phase 3 (2027-30)

- Integrated Transport Management System to streamline traffic flow

Urban Mass Transport Development

a) Phase 1 (2019-21)

- Update Master Plan to include Transit Oriented Development
- Fleet modernization and remodeling of river transport services

b) Phase 2 (2022-26)

- Metro Infra Plan and Designing
- Land Acquisition Plan for Metro development

c) Phase 3 (2027-30)

- Route Scheduling to Integrate Metro Schedule with bus, ferry and other modes of transport

Promotion of Non-motorized Transport

a) Phase 1 (2019-21)

- Regulate passenger & freight movement
- Plan Dedicated Pedestrian Facilities
- Enhanced city-wide signage

b) Phase 2 (2022-26)

- Identify and plan corridors for improved access to pedestrian and NMT vehicles
- Critical Junction / Node Improvement Plans

c) Phase 3 (2027-30)

- Develop dedicated lanes to encourage walking and cycling

Emission Control Measures

a) Phase 1 (2019-21)

- Monitoring of Vehicle health check process
- Introduce CNG for greener public transport
- Complete digitization of vehicle registration process

b) Phase 2 (2022-26)

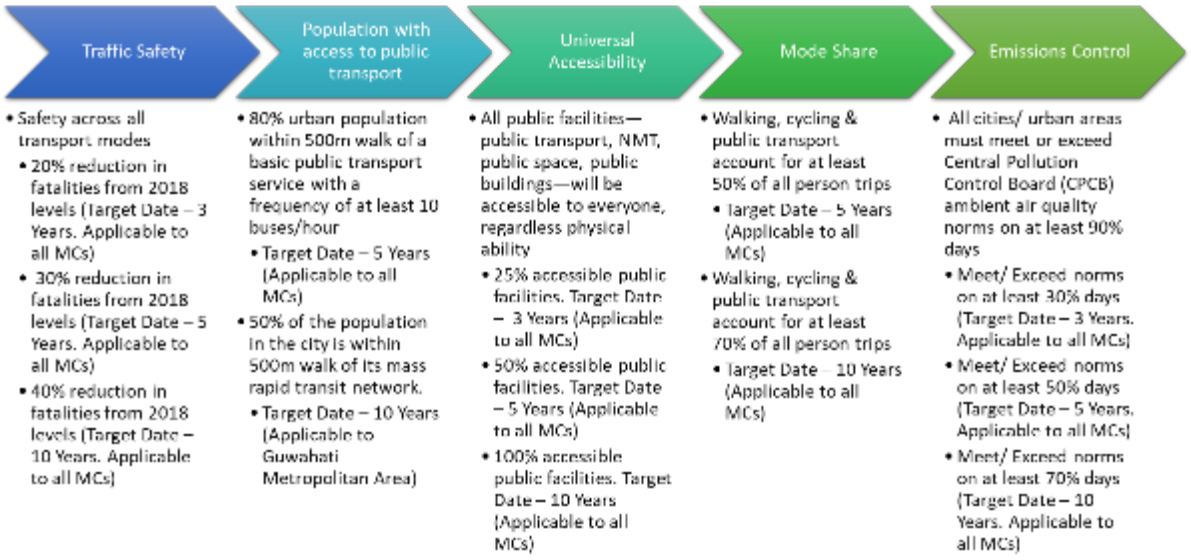
- Monitoring of City Pollution Maps through distributed sensors
- Congestion Charging & last mile connectivity

c) Phase 3 (2027-30)

- Integrated Parking And Travel Demand Management

SMART KPIs

Additionally, the Action Plan is envisaged to be monitored through the following suggested KPIs.



OUTCOME

The overall strategy is a three pronged triple bottom line approach which reflects key outcomes for the state on the economic, social and environmental dynamics.

The economic outcomes envisaged are:

- Revenue augmentation due to alternate sources of income
- Controlled spending and data-based investment planning
- Reduction in leakages due to technology enablement and e-vigilance

Social benefits accruing are :

- Increased access to public transport due to integration of key modes
- Increased convenience due to ease of payment and live tracking of vehicle locations
- Decrease in congestion due to dedicated corridors for particular modes
- Enhanced safety due to traffic management and transparency in processes
- Employment generation for skilled youth

Environmental benefits envisaged are:

- Improved quality of life through affordable and cleaner public transport
- Reduction in Air, Water, Sound, Soil pollution due to adoption of NMT, Electric Vehicles and improved walkability
- Reduced dependency on fossil fuel (energy efficiency) by adopting alternate sources of fuels such as solar and electric batteries.

BIHAR

Introduction

Transportation and mobility are emerging as potential drivers of innovation and economic growth in the 21st century. Rapidly evolving technologies and business models for delivering mobility services have dramatic potential to transform the global transportation sector in the times to come in Bihar. Mobility that ranges from pedestrian, personal transport, to public transit and freight movement is extremely critical and impacts every aspect of life in urban as well as rural areas. So far public transport initiatives have mainly focused on urban areas neglecting the last mile connectivity thus resulting in individuals to adopt personalized modes of transport which has led to congestion and vehicular pollution.

To meet these ambitious objectives, it is imperative for the states to come together to transform the mobility ecosystem of the country and Bihar has already formulated a Mobility Strategy for the state after due deliberation on strengths, opportunities and challenges lying therein.

Bihar at a Glance

India is poised for rapid economic growth and Bihar is t third largest State of India by Population (10.4 Crores Population as per 2011 Census).Bihar has a land area is about 94,163 km^2 and its urban population is currently around only 12% of its total population. Major Transport Modes are: Roads (20,068 km),Railways (3730 Km) ,Air ways (Two Operational Airports: Patna & Gaya) and Inland Water Transport (Length of National Waterways: 420 km -Major Rivers: Ganges, Koshi,Gandak,Shone, Kiul,Mahananda,Falgu & No. of Registered Boats-6581 on 31st March,2018).In addition the State has seen an increase in the numbers of Vehicle Registration of about

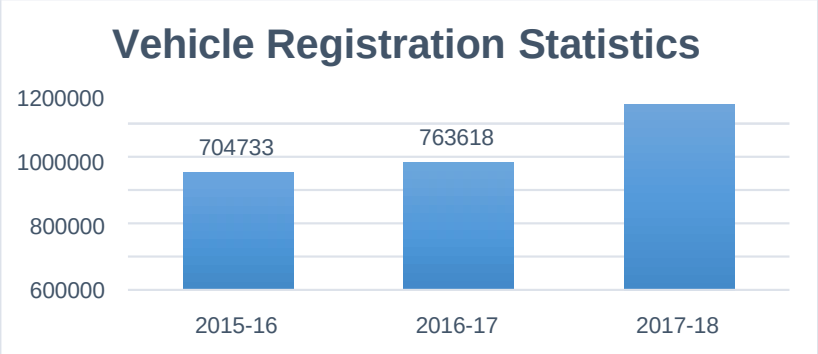
3.5 Lacs (FY 2017-18: 11.14 Lacs vs FY 2016-17:7.64 Lacs);total vehicles plying on the Road is about 65 Lacs. Length of Total Road Network is of 20,068.03 km.

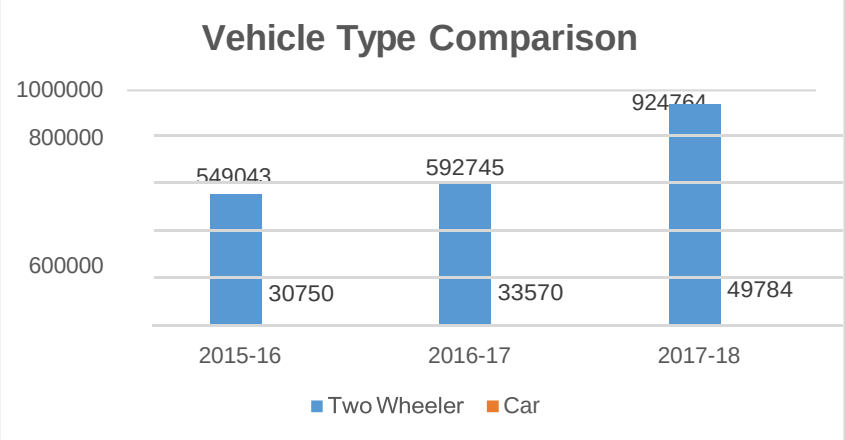
[Note: Vehicle Population Details & Road Network at Bihar] has been provided below.

Vehicle Population Statistics

Vehicle Type	Number of New Vehicles Registration							
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Truck	6987	9719	10190	10732	12532	14423	19646	22770
Bus	1494	1394	1895	1646	1746	1691	2676	2833
Car	18814	23495	24452	23413	27557	30750	33570	49784
Taxi	5419	8595	14346	11761	6794	6192	5033	6040
Jeep	9746	9071	9815	9476	9137	11762	8750	12668
Three-Wheeler	17422	20698	30387	35353	31258	36623	41877	37003
Two-Wheeler	292404	331052	362068	419724	477333	549043	592745	924764
Tractor	21055	22954	30478	31354	33707	34770	38076	32683
Trailer	10942	11404	10854	8011	12394	18005	20224	13900
Others	1940	1289	2333	2228	1742	1474	1021	11361
Total	386223	439671	496818	553698	614200	704733	763618	1113806

Vehicle Registration Statistics in last three Financial Years





Road Length Relating to Area and Population

Road length in Km.			Road length in Km. Per 100 Sq. Km. of areas		Road length in Km. per lakh of population	
	Total	Surfaced	Total	Surfaced	Total	Surfaced
1	2	3	4	5	6	7
All India	15,02,697	6,92,171	45.70	21.05	219.75	101.22
Bihar	83,601	28,659	48.08	16.48	119.60	41.00
(Tribal Sub Plan)	(10,000)	(4,400)	(22.80)	(10.05)	(135.14)	(59.40)

Source: Draft seventh five year plan of Bihar.

Present Modes of Urban & Rural Mobility

Urban Mode	Rural Mode
Private Vehicles	Private Vehicles
Intra & Inter City Bus Services	Rural Bus Services
Shared Vehicles	Three/Two Wheelers
Three/Two Wheelers	E-Rickshaw
E-Rickshaw	Railways
Railways	Inland Water Transport (Small & Medium Sized Boats)
Airways	Bicycles & Walking
Bicycles & Walking	Jugaad Vahan

Being an Agriculture Dominated State & Rich in Minerals Goods Transportation Plays an Important Role.

Points to be addressed on Mobility Strategy (Bihar)

"Shared Connected and Zero Emission World" is the vision of the Niti Ayog on Mobility.

- Creation of Integrated Transport Plan for the whole state & all cities of Bihar.
- Long Bridges are required for Public Transportation because of the numerous rivers.
- Elevated Road Infrastructure need to be developed for few specific districts and the cost is very high due to occasional Floods & change in Water Level.
- Land Acquisition is a major Problems in Bihar and requires sufficient funding.
- Rail and Air Connectivity needs to be addressed. Small Airports need to be developed throughout the State.
- Legislation & Incentives for usage of Alternative Fuels.
- Focus need be on Last Mile Road Connectivity from Ghats in riverine areas.
- Siltation of River is a major issue which is hampering Inland Waterways transport. This need to be addressed in a comprehensive manner.
- Road Safety Awareness to inculcate Road Discipline & Change in People's Behavior.
- Damages to Infrastructure due to Flood .Rivers are not navigable throughout the year.
- State Transport Corporation is present but is operationally/financially weak and viability gap funding is required.
- Focus on popularizing e-rickshaws & electricity powered vehicles.
- Bihar economy is mostly driven by Agriculture Production and Supply Chain should be there for connecting to the nearest markets/towns. Setting of Logistics Park having various modes of Transport access & comprising of mechanized warehouses is required
- Mobility & Public Transport: Exploring different business models: Intermediary services, Ride sharing, Vehicle sharing, Aggregators and Fixed-route commuter services.
- Special attention to the needs of women, children, handicapped, senior citizens and persons belonging to vulnerable sections of society.
- Mobility requirements for youth population.

State (Bihar) Strategy Plan for Mobility

- Integrated Land Usage & Transport Planning
  - Improved Road Network
  - Land Use Integration
  - Footpaths/walkways, sidewalks, foot over-bridges and facilities for non-motorized transport (bicycles and cycle-rickshaws).

Government Initiatives:

Footbridges, sideways have been developed in major Cities & on National Highways. Govt. is funding for new & existing Road Infrastructure.

- Modal Mix & Priority Transport Services
  - Interconnection of Urban & Sub-urban Network
  - Optimization & Integration of Transport Modes
  - High Speed Inter City Railway Services (Patna to Purnea, Patna to Bhagalpur, Patna to Gaya, Patna to Darbhanga via Muzaffarpur)

Government Initiatives:

- Govt. is promoting New Business Models –shared & connected mobility for Urban & Rural Bus Connectivity.
- Bihar already has a Railway network with States i.e. UP, Bengal, Odisha, Chhattisgarh, Delhi and State is planning to have new Bus routes with the states. (Interstate Connectivity)
- In addition to this, Bihar will start New Bus Services to Nepal. (International)

- Use of Clean Fuel & Clear Technology
    - Promotion of E-Rickshaws
    - Use of CNG Based Vehicles
    - Promotion of Non-Motorized Transport

Government Initiatives:

- Tax incentives have been provided to E-rickshaw.
- Govt. is trying to adopt CNG Based Vehicles and MOU with GAIL India has been signed.

- Public Transport Promotion & City Bus Services
    - Prioritize traffic for public buses
    - Subsidize fares for public transport
    - Increase the number of buses and terminals at primary locations
    - PPP Modes for Bus Terminals
    - Connectivity to rural areas through buses operated by STU

Government Initiatives:

- 9 New Routes for City Bus Services have been introduced at Patna.
- More than 40k commuters travelled the same on daily basis.
- Training of Drivers, Conductors & Helpers are at Planning Stage.
- Mukhamantri Gram Parivahan Yojana started in 4000+ Gram Panchayats at Bihar. This will facilitate Last Mile Shared Mobility in Rural Areas.
- Motor Driving Training Institute (IDTR) has already made operational at Aurangabad. Schemes for Regional Driving Institute already in progress.
- Inland Motor Transport is important from Bihar's Perspective and Govt. has promoted the Boat Registration and special incentives on the same.

- Smarter Urban Transport
    - Intelligent Transport System
    - Traffic Management
    - E-Ticketing/Smart Card based Ticketing System
    - Smart Parking Facility
    - RFID in freight transportation
    - Cyber Security of Traffic systems

Government Initiatives:

- 4 Cities (Patna, Muzaffarpur, Bhagalpur, Bihar-Sharif) have been selected under Smart City Project. Electric Bus Proposals has already been send to Smart City for further process.
- Intelligent Transport Project is a part of Smart City Project and Transport Department also intends to adopt E-Ticketing in future.
- Special incentives on Bus Tickets have been provided for the differentially abled & students.
- CCTV based E-Challan has been started at Patna as a Part of Traffic Management.
- Passenger Information System will be launched soon at State Road Transport Authority undertaken Buses.
- GPS has been enabled in all the City Buses plying at Patna.
- "Livability" Improvement & Shared Cars
    - Encourage walking/cycling
    - Promote environmentally friendly cities
    - Support walkability for the planned Central Business Districts (CBDs)
    - Taxi tolling on city entrances
    - Maintain taxi fleet size by freezing number of taxi licenses in circulation
    - Optimize the use of private vehicles
    - Sharing/Pool Cars

Government Initiatives:

- Aggregator Policy and Rent a cab/motorcycle scheme is in Pipeline.
- Through "*Mukhamantri Balak/balika Yojana"* more than 47 Lacs Bicycles has been distributed and thus focusing on the Non-Motorized Transport.
- Shared Taxi & Cab Services started from Major Railway and Airports as a part of PPP/Government Initiatives.

Present Initiatives in Transport Mobility

- Aggregator Policy is in the Final Stage.
- Bike/Taxi Policy in the Final Stage.
- Inland Vessel Rule & Model Boat Rule have already been notified.
- City Buses are fitted with GPS and functioning.
- Agreement on purchasing of Premium Buses from ASRTU is in progress.
- E-Ticketing & Smart Card Based Ticketing System will be launched shortly.
- New Routes on City Bus Transportation under BSRTC has been launched and more than forty five thousands commuters (45,000) are travelling every day.
- Various Initiatives taken on Road Safety Awareness & matters related to Road Safety.
- Rural Transport Connectivity scheme is in Final Stage. Thus it will fulfill the Last Mile Connectivity.

Non-Motorized Transport

With increasing urban sprawl and rising income levels, motorized transport has gained popularity. Statistics show that the share of bicycle trips out of the total trips in India has declined from 17% in 1994 to 7% in 2014. The longer trip lengths have made cycling more difficult.

Further, non-motorized modes are also exposed to greater risk of accidents as they share a common right of way with motorized vehicles. However, non-motorized modes are environmentally friendly and have to be given their due share in the transport system of a city. The problems being faced by them would have to be mitigated.

Thus primary objectives is to increase the recognition of NMT as one of the key transport modes and essential component of public transport.

NMT Need	Policy Requirements
Walking and cycling space limited or even nonexistent along roads	Improve the physical infrastructure of roads, cities and urban centers (Roads and road maintenance)
Lack of quality public spaces to and around the city transport terminals	Recognition of equal rights to all road users
Streets with no clean air (polluted)	Recognition of the importance of walking and bicycling as non-polluting, sustainable, environmentally friendly and healthy transport options
Road footways often encroached upon by vendors	Promote Non-motorized transport technologies (bicycle designs suitable for users, readily available and affordable)
Narrow streets with road side parking	Link all bus stops with non-motorized access
Provide safe infrastructure for pedestrians and cyclists	Include adequate facilities for NMT on every major road improvement project

Environmental Assessment

Various Initiatives have been taken to control & regulate the Vehicular Pollution.

Proposed Action Plans:

- BS-IV Norms launched from April,2014 is being enforced in the State
- State of Bihar would emphasize on gas based fuel like CNG,LPG & Battery Operated Vehicles, Battery Operated Vehicles
- Promotion of Public Transport System
- PUC Enforcement
- Incentives & Regulations to Alternate Mode of Vehicles
- Improvement & Augmentation in Transport related Infrastructure
- Awareness Raising
- Traffic Planning & Management
- Car Pooling & Shared Vehicles

Outlook

Bihar is poised for impressive economic growth with GSDP growing at 7.6% compared to 6.8 percent for the national economy. The sectoral growth rates indicate that the following sectors, each recording growth rates of more than 10 percent, are drivers of growth of Bihar economy — manufacturing (17.7 percent), electricity, gas and water supply (15.2 percent), trade, repair, hotels and restaurants (14.6 percent), transport, storage and communications (12.6 percent), and fishing and aquaculture (10 percent).This is backed by a 15 Million young population (age group: 20-39) base.

In the next decade, sustainable choices for public transport coupled with greener fuels will greatly enhance the quality of life for the citizens and give a push to the economic activity in the long term. Combination of strong policies, regulation, public and private sector investments and public awareness will bring the desired change for implementing and executing the dream of smart transportation in the State.

Chandigarh

INTRODUCTION:

Chandigarh being administered as Union Territory serves as the Capital of two states; Punjab and Haryana. It is land-locked by three states touching its boundary. Himachal Pradesh is the third state. It has an area of 114 Sq Kms and population of just over a million (as per 2011 census). However it is actually a tri-city with adjoining cities of Mohali (Punjab) and Panchkula (Haryana). There are other satellite towns such as Kharar, Zirakpur, Dera Bassi, Kurali, Morinda, Baddi, Pinjore, Kalka around it within a range of 30-40Kms (Map attached as **Annexure-I** may be referred to). Chandigarh has witnessed a population increase of more than forty four times with the absolute population increasing from 24,261 in 1951 to 10,54,686 in 2011. The Union Territory recorded a population of 10,54,686 in 2011 with much lower decadal rate of increase in population with only 154051 people being added to the Chandigarh UT during the last decade. The growth rate of merely 17.10% between 2001-2011 is the slowest since its inception. This is perhaps due to the rapid pace of urbanization taking place in the neighbouring towns of Mohali, Panchkula, Zirakpur, Kalka, Kharar, etc. falling within the 16 km periphery area. Density for phase I, II and III based on Census 2001 and holding capacity may be referred to **Annexure-II & III.**

The Public Transport System in Chandigarh is mainly the Bus Transport which had 11% mode share as per the Comprehensive Mobility Plan (CMP 2009). This would have improved as the number of buses in local and sub-urban sector has increased from 200 to 400 approx in last 3-4 years. Currently 392 buses are operating the local routes and 40 are serving the sub-urban areas. Besides this, there are 130 buses operating long inter-city routes which shall be further strengthened by addition of 80 HVAC buses this year. The Existing transport methods largely consist of personalized mode of transport in shape of two wheelers/ four wheelers. As per the Comprehensive Mobility Plan 2009, the mode share of trips using personalized mode of transport was 61% (excluding walk). It must have been reduced in percentage terms due to introduction of about 5000 vehicles by web based aggregators (OLA/UBER) and augmentation of Public Transport System recently.

The Intermediate Para Transport system (IPTs) which were in form of Autos and Radio taxi in Year 2009 had a mode share of 10% which probably has

increased due to strengthening of this sector due to the introduction of new stakeholders in the form of web-based aggregators.

Lastly the pedestrian and cycle trips were noted to be 28% in 2009 which may have seen a downward trend in relative terms as the absolute number of road trips (of other modes of transport) must have increased over last decade. However the extensive work being done on cycle tracks and introduction of Public bike sharing (PBS) in near future may have a positive impact on this segment.

The modal Split as per CMP 2009 is attached **as Annexure IV.**

VISION AND OBJECTIVES:

The vision statement defined by the NITI Aayog lays down the principles of Inter-modal, Connected, Shared, Safe, Inclusive, Economical and clean systems for mobility. The basic precept is to break away from the conventional model which relies upon provision of transportation as an infrastructure project. The new model intends to achieve the mobility in a more holistic manner. It takes into account the features and concepts essential for designing a modern transport system in a unified manner based upon demand side factors which essentially is friendly to the environment. Accordingly Chandigarh Administration has laid down the objectives to be achieved through this strategy paper which are listed as below

a) The basic purpose is to move the people more efficiently so that there is comparatively lesser burden on road space, infrastructure and environment.
b) The other objective is as to how to optimize the usage of resources by redefining and restructuring mobility modes and re-setting of the priorities.
c) It also aims at re-allocation of road space and accommodating pedestrians and cyclists.
d) The new model shall dovetail the promotion of public transport as well as shared private transport.
e) The improvement in Road Safety and Public Safety through social and engineering interventions is one of the prime objectives.

However the specificities of Chandigarh Plan for transforming Mobility can be listed only once the existing systems are studied in the light of strengths, opportunities and challenges present in the city.

EXISTING SCENARIO (STRENGTHS, OPPURTUNITIES & CHANLLENGES):

The current scenario and emerging trends in Chandigarh need to be understood perfectly before any plan is etched for the city.

First, It needs to be appreciated that mobility in Chandigarh cannot be planned without taking into account the neighboring cities viz. Mohali and Panchkula. From the point of Urban mobility Chandigarh is an integral part of tri-city. For any model to be successful the mobility has to be seamless across the tri-city. Not only that the level and quality of service has to be of same standard the services have to be planned considering the tri-city as one unit. Currently Panchkula operates some local service which is at minimal level (about 20 buses) while Mohali has no city bus of its own. Largely it is Chandigarh Transport Undertaking (CTU) which operates local operation in the tri-city.

Although Chandigarh is land-locked and area of city is limited yet the tri-city is expanding. The development around tri-city is taking place with huge urban sprawl. Although the population of the tri-city is not increasing enormously yet the new habitations are coming up at a fairly long distance from heart of the tri-city. New areas such as Aero-city, Eco-city, IT city Mohali and new sectors of Panchkula are at distance of about 25-30 Kms from the city centre. Besides the sub-urban towns such as Kurali, Morinda, Baddi, Lalru, Banur, Nalagarh, Pinjore are gaining prominence and there are many daily passenger commuters from these places. These have to be accommodated in the mobility plan of Chandigarh as well. Any scale up in services is possible only through the participation of all three cities at planning level as well as by way of financial contribution.

It is, thus, amply clear that Chandigarh Mobility Plan has to be designed for the tri-city and planning has to be done at the regional level. The city Governments of

Chandigarh, Mohali and Panchkula have to join hands to formulate a regional plan for the tri-city including the peripheral towns.

3.2 Secondly the population growth of Chandigarh in last one decade is estimated as 1.4% per annum while the Vehicle growth is 5% per annum for the same period. Besides this there is inflow of vehicles from other States into city daily. Many vehicles use the city as corridor crossing from one town to the other town. The congestion on the city roads is increasing day by day and travelling time has doubled in the last decade. The situation is far worse during the peak hours.

This creates a demand for an efficient, reliable and good quality Public Transport System. The IPTs also need to be integrated with the Public Transport (PT) in terms of schedule and charging of fare so that Public deems it a one common integrated system. Besides this, Public Bike Sharing (PBS) and first/last mile connectivity have to be designed as integral features of new mobility scenario.

3.3 There are issues of regulation, enforcement and Public safety which emerge as points of debate in the tri-city. The crime incidents involving auto-drivers in last two-three years have raised the question of Public safety and onus is on Administration as to how to keep auto-drivers under check. An efficient IT based monitoring system in which Public reposes the faith is the need of the hour.

There are new modes of IPTs in the fray in form of web- based Taxi aggregators i.e. OLA/ UBER/ Autos (Jugnu). There are issues of their regulation as their affairs with the driver-partners and clients are not transparent. The regulator i.e. State Transport Authority has not much capacity to deal with all such issues. There is need of training as well as capacity building of the regulator. The other problem is to integrate these with the Public Transport to offer the Mobility as a Service (MaaS). Using E-rickshaws as the first and last mile connectivity mode will be an innovative idea where these vehicles are solely used for this purpose and their presence on the main roads will be prohibited.

3. As the 50,000 vehicles (approx) are added in the city every year the vehicular population is increasing at an alarming rate. This is not only choking the roads but also the parking slots of the city. The roads in the residential areas can be seen occupied with vehicles leaving little space for the movement particularly in the areas

with small houses (Marla size). The pedestrian footpaths are the first victim of encroachment by these vehicles. Thus Chandigarh administration is grappling with the challenge of encroachment and finding the ways to manage the parking needs.

3.5 The cycling paths and pedestrian footpaths are not very extensive in the city. Although their presence is more than that in any other Indian city yet they are not supportive to the use of foot or cycle. As in language of a foreign town planner “City does not invite you to walk or cycle”. To achieve that level, Infrastructure has to be upgraded and it has become priority recently. The cycle tracks are being extended from existing length of 60 Kms to 150 Kms. The cross-junctions are being re-designed to allow free flow to cyclists at the round-about. The encroachment on footpaths in interiors of the sectors has to be dealt sternly in accordance with law. The launching of Public Bike Sharing (PBS) which is going to happen soon is expected to further promote the use of these NMT modes of transport.

3. The city has earmarked spaces in the parking for the differently-abled persons from where they can easily access the markets. ISBTs have functional ramps and wheel chairs to make these accessible. Public transport also has been kept low floor and offer a ramp facility for differently-able persons. However there is a need for these public buildings and facilities to be re-audited and equipped with ancillary support such as wheel-chair, ramp-boards etc. to make them accessible to the differently-abled persons.

3.7 The issue of Road safety is catching the attention of Administration and Courts. Keeping it on high pedestal, Chandigarh has conceptualized to build an institutional support in the form of “Centre of Excellence in Road safety” recently. The Road Safety Fund corpus shall be at its disposal for building capacity as well as providing support to road safety/ audit measure. Not only the black spot removal or accident analysis/ investigation is the mandate of this Centre to carry out social campaigns and imbibing the best practices is also main function. This holds a wonderful opportunity to make city roads free of fatality.

3.8 Last but not the least, all the above mentioned factors have their impact on the environment. It is not surprising that each year level of harmful gases and particulate matter is increasing. One positive is that there has been increase of green cover in

Chandigarh over last one decade; it has increased from 26% to 41% (from 2001 to 2017) which has mitigated the impact of increasing population of vehicles to an extent yet there is no alternative to go for clean fuels. CNG is latest entrant in the city. The web-aggregator policy mandates shifting of all the vehicles operated by them on CNG/Battery operated vehicle within one year of operations. Eventually all the heavy vehicles plying in the tri-city, e.g. Public transport/ school buses etc. may also be shifted to CNG or E-mode. Thus adoption of clean fuels through a policy statement towards this purpose shall provide an opportunity to have long lasting impact on city air.

City has no water transport potential while the air and rail connectivity is very good with other national cities. City will get an international airport shortly.

The above scenario intertwines the strengths, opportunities and challenges which the city poses before the Task force. Taking it as a base the roadmap for transforming mobility has to be spelt. An action plan accordingly can be framed in two parts; one is for low to medium term with a timeframe of 2-3 years and other is for long term with a vision of 4-7 years.

STRATEGY LEVERS FOR MOBILITY ACTION PLAN (SHORT-TERM):

The strategic levers are envisaged as the interventions in short term which are of incremental nature improving upon the existing systems or extending the range of benefits of these by adding small projects. The short term action plan shall be over 2-3 years period. There can be broadly categorized in to two parts as the city level and regional level interventions. Accordingly different mechanisms and forums need to be created to deal with them separately. First the city level interventions are listed which are largely with-in the domain of the Chandigarh Administration.

4.1 AUGMENTATION OF BUS SYSTEM:

a) **Quantity:** The current bus system has been serving the city with approx. 400 buses while 130 buses are for long routes. The current frequency of the city buses during peak time is 15-20 min which may further be improved with a new target frequency of 7-8 min. This shall require augmentation of the fleet.

A scientific business and service plan shall be worked out by conducting a professional study and enhancement in the fleet shall be undertaken as per the demand assessment made therein. New innovative financing models based upon the Gross cost contract model (GCC), Net cost contract model (NCC) or hybrid contract model shall be worked out after evaluating the report. Already 1.5 lakhs passengers are using the bus system daily and it is hoped that the augmentation of services and increase in the frequency shall make the bus system further popular.

b) **Quality:** The current bus system is running according to the manual processes and old procedural system. Although there has been attempts made recently to upgrade the procedures by IT based interventions such as Electronic ticketing machine (ETM) based ticketing, RFID based fuel dispensation system, SMS based crew control (scheduling and roster) and launching of mobile applications for disseminating information yet these interventions are projects in isolation. A complete ITS (Intelligent Transport System) overhaul is planned for Chandigarh transport buses under the World Bank funded project which is due for completion in 2019. This shall make the bus system reliable and efficient.

Moreover the quality and comfort of city buses needs to be increased by the introduction of high quality buses so that two-wheelers/ four wheelers users find these worth switching to and give up their personalized modes of travel. Accordingly any further addition of buses has to be done in semi-luxury segment having good features such as Heat/ Air conditioning facility, Wi-FI and infotainment on board at the least.

c) **First/ Last Mile connectivity:** The transport system becomes a preferred mode if end to end solution is available. To make it so, city is planning to use the E-rickshaws for first/ last mile connectivity. As the usage of E-rickshaws is prohibited on main roads (V1 and V2 roads) they can ply in the interiors of the sector and are best suited to serve as first/ last mile connectivity mode. City proposes to build end to end transport solution by integrating E-rickshaws formally into the bus transport system.

d) **Shuttle Service (for IT parks/ Airport):** There are clients (such as IT professionals/ Doctors/ Airport passengers etc) who require services with offer extra comfort, reduce the travel time and is available at odd hours. City proposes to introduce high-end shuttle services for these professionals to cater to the IT park/ Airport/ Institutes etc.

4.2 PUBLIC BIKE SHARING (PBS) SCHEME: To encourage the NMT modes, Chandigarh is extending the cycle network from existing 60Kms to 150kms; however there are issues of maintaining discipline of bicycle lanes and promotion of NMT. The city proposes to introduce a Public Bike sharing (PBS) scheme to make the cycling popular in the city. Some of the zones or institutes with consultations of stake-holders shall also be declared motor-vehicle free zones.

4.3 PARKING POLICY: Chandigarh urban policy department has prepared a draft policy for parking of vehicles on which suggestions/ observations have been received from the Public. After due evaluation of these, a final policy to deal with parking issues of Chandigarh is proposed to be issued enabling use of IT for optimized use of available Parking spaces. The other features shall deal with identifying, delineating and marking these spaces so that a comprehensive inventory is prepared. Due provisions to effectively manage Parking and tackle enforcement issues shall be introduced. There is also need to create parking spaces for the E-rickshaws/ IPTs/ School buses so that they are not parked on roads or unauthorized spaces.

4.4 PEDESTRIAN FRIENDLY ROADS: The pedestrians find it difficult to walk as the provision of well lit inter-connected network of pedestrian paths need to be created around the city. The sub-passes planning to connect the sectors is proposed so that a keen walker can move around the city without having to use the main roads. The footpaths are seen encroached by the vehicles everywhere forcing the pedestrian to walk on the main road. Effective ways and means to enforce the right of way in favour of pedestrians shall be implemented soon. The installation of pelican lights and correction in position

of Zebra crossing are the two main activities identified besides the other upgradation of the infrastructure

4.5 UPGRADATION OF TRANSPORT AREA (FREIGHT MANGEMENT): Although the number of goods carriage vehicles is very limited in the city yet they are the lifeline for the city as essential supplies are transported through these. The immediate improvement and maintenance of these areas shall be undertaken in short term while the comprehensive logistic planning shall be part of Long term Plan.

4.6 CAPACITY BUILDING IN REGULATION: There are vast changes happening in the transport sector and new actors are joining the stage such as web based aggregators, E-rickshaws etc. raising the challenge related control of traffic (lane regulation), Public safety and related issues, safety of students, use of panic button and emergency response protocol etc. It requires a rigorous training and updating the skill of transport authorities as Regulator. There shall be effective measures taken to build Capacity of the regulator and necessary skill shall be imparted to cope with such changes.

There are other issues which are to be dealt at the regional level with participation of State of Punjab and Haryana and which can be implemented in short term are enlisted hereby

4.7 TRI-CITY URBAN PLANNING AND TRANSPORT: It is already discussed in the scenario part that it requires lot of synergies among the three cities to have an integrated regional plan for the city. Thus possibility for creation of regional groups on urban planning, engineering and transport shall be explored with the States of Punjab and Haryana. A common transport corporation (Greater Chandigarh Transport Corporation) is envisaged if the states find the same feasible besides having common infrastructure design.

4.8 AGREEMENT WITH STATES: A tri-partite agreement is envisaged to deal with the issues of mobility across the tri-city as it involves issues of policy/

taxation and unification of rates so that there are no intangible barriers to mobility across the states. The last agreement was done in 2008 with Punjab and no agreement with Haryana is in place so far. Therefore fresh agreements are envisaged in which two parts can be formed; one for inter-city issues such as Taxis, School buses, Public Transport etc and other part for Inter-state issues such as Goods Carriage, Stage carriage, contract carriage etc.

4.9 **ROAD SAFETY:** Any action plan for mobility without consideration for road safety shall be incomplete. It is important for Administration, road-users and NGOs. Taking pro-active steps Chandigarh Administration has created a "Centre of Excellence in Road Safety" which shall be an institution to build capacity through national/inter-national collaborations, undertake research and develop data analysis and accident investigation skills. To render it functional, a road safety fund corpus is also being created. A separate exercise shall be undertaken by this centre to develop a Road Safety Plan for the region with participation of the States. Creating awareness of amongst public through carefully crafted Social campaigns is also the mandate of this Centre. The imbibing of best practices and fresh research with the aim to correction in behaviour on road and generating respect for law shall be undertaken at the Centre.

4.10 **PUBLIC SAFETY:** There are number of instances of crime/attempted crime against women. Therefore there is a sense of fear while using IPTs such as Autos/ Taxis or E-rickshaw particularly at odd hours involving. Therefore Chandigarh Administration is contemplating to invoke the innovative use of technology by introducing QR based IDs to drivers of these IPTs. Besides this another project of E-surveillance of the city by using over thousand cameras (ANPRs/ PTZ/ night vision cameras etc) is being implemented. The same cameras shall be utilized for integrated traffic management system (ITMS) to regulate the traffic flow and enforcement. This shall help in creating a green corridor as well as introducing E-challaning in the city. These effective

measures shall address the related issue of Public safety also to a great extent.

5.0 STRATEGY LEVERS FOR MOBILITY ACTION PLAN (LONG-TERM):

The systemic changes and interventions which need widespread stake-holder consultation shall require more serious consideration at various levels. Moreover such issues require consensus from the regional partners which are governed by different administrations and political systems. Although the work on such interventions shall start right away and the period during short term shall be utilized to finalize the plans to be implemented during long term. Thus the interventions pertaining to long term mobility action plan with a perspective of 4-7 years are enlisted below:

5.1 TRI-CITY ISSUES: HOLISTIC PLANNING: Long term comprehensive plan for transforming mobility in Chandigarh and adjoining regions would entail expansion of road network, new connections with possibility of dedicated corridors for freight and Public Transport, Ring roads, possibility of a Ring rail for fast commuting with sub-urban areas with synergy to effect an efficient and convenient transport solution. As part of short-term mobility action plan it is expected that regional groups on relevant topics shall be constituted which shall present the regional plans (topic wise) to the Apex regional body consisting of the Chief Secretaries of the states and Adviser of the Chandigarh UT. The holistic plan for regional mobility shall be prepared keeping in view all the aspects of Urban Planning, Transport, Engineering feasibility and the common Policy denominator in short term period. This plan shall be implemented during long term action plan period.

5.2 MASS RAPID TRANSPORT SYSTEM: The economic development of the region cannot be imagined without an efficient and fast mobility system. The main focus of the regional mobility plan shall be to study and identify the Mass Rapid Transport System which is suitable to the region. It shall be the core of mobility plan with other systems i.e. Bus Sytem, PBS and E-rickshaws (first/last mile connectivity) well integrated with the system. The park and ride

facilities to integrate the personal modes with MRTS shall also be given due attention. Tri-city authorities shall work to finalize upon the planning of MRTS in short term while the same shall be implemented in long term phase.

5.3 INFRASTRUCTURE FOR BUS HIGH LEVEL SERVICE (BHLS); PRIORITY LANING, PRIORITY SIGNAL: During the short term Mobility action plan, Bus system is proposed to be improved in quality and quantity but it shall be planned to manage the high traffic corridors with high level of bus service (BHLS). Further it shall be built upon with provision of luxury buses with modern amenities, priority laning and priority signalling during peak hours to allow faster movement and other such features so as to make it a preferred mean of transport over the personalized modes.

5.4 COMPREHENSIVE LOGISTIC PLAN: Chandigarh has a strategic location sitting at the centre of three states thus acting as the gateway to northern states. The main economic activity is tertiary sector as the manufacturing activity is on decline in the city. Primary sector is negligible already given the urban character of territory. Given the good rail connectivity with national centres, City holds good potential to emerge as a regional logistic hub for supplies to the states. The planning for comprehensive logistic park aligned with rail services can act as economic booster for the region.

5.5 ZERO EMISSION PLAN: Chandigarh cherishes a healthy environment and has taken steps to go green in big way. It has the highest percentage of roof top solar power plants. State has mandated to have solar energy generation for institutional buildings and residential buildings (above one canal). State is trying to promote Electric vehicles by giving complete exemption from road tax on these. A notification regarding this has already been made. Thus State envisages drafting a zero emission mobility plan in short term which shall be implemented during long term mobility action plan period.

5.6 ENGINEERING CAPACITY AND DELIVERY: The implementation of short term and long term action plans elaborated above shall require an eco-

system which to a great extent involve engineering interventions of a scale and quality of the highest order. The success of these action plans are hinged upon the increase in capacity and delivery of engineering department. The detailed exercise shall be undertaken to enlist all supporting engineering interventions with a given time frame in which these shall be implemented.

6.0 IMMEDIATE MOBILITY ACTION PLAN:

Interventions	**Key Action Areas**	**Implementing Agencies**	**Deadline**
1. Shared Mobility	Promoting ITS enabled carpooling system for the city with a view to own the ride instead of vehicle. Primarily focused to address mobility needs of employees and students.	Transport, Department, Chandigarh Administration.	2018-2019
2. City Navigation App	A one stop solution for citizens and tourists to navigate within in the city	Department of Urban Planning, Chandigarh Administration.	2018-2019
3. Public Bike Sharing (PBS) Scheme.	Installation of ITS enabled PBS System comprising 5000 bicycles at 500 locations in UT Chandigarh.	Chandigarh Smart City Limited (CSCL)	2018-2019

4. Augmentation of Bus System.	ITS enabled system coupled with first and last mile connectivity	Transport Department, Chandigarh Administration	2018-2019
5. Zero Emission Plan	Introduction of first lot of 20 Electric Buses on potential corridors	Transport Department, Chandigarh Administration	2018-2019
6. Centre of Excellence in Road Safety	The operationalization of the centre by recruitment/ assigning the dedicated staff and imparting training to build their capacity	Traffic Police Chandigarh	2018-2019

CONCLUSIONS:

State Task Force has laid down the guiding principles through this strategy paper for transforming mobility scenario in Chandigarh and the surrounding region. The pre-requisites for the success of this plan are participation and contribution (particularly financial) by the neighboring States and proper engagement of all stake-holders. It shall require a task force to be constituted at Regional level and another one at the city level which shall plan and monitor all the interventions. However the plan has been attempted with a holistic view of mobility including the peripheral issues of Safety and Environment Sustainability. It is hoped that this plan for transforming mobility if implemented in letter and spirit shall rejuvenate the economy and life standards of inhabitants of this whole region.

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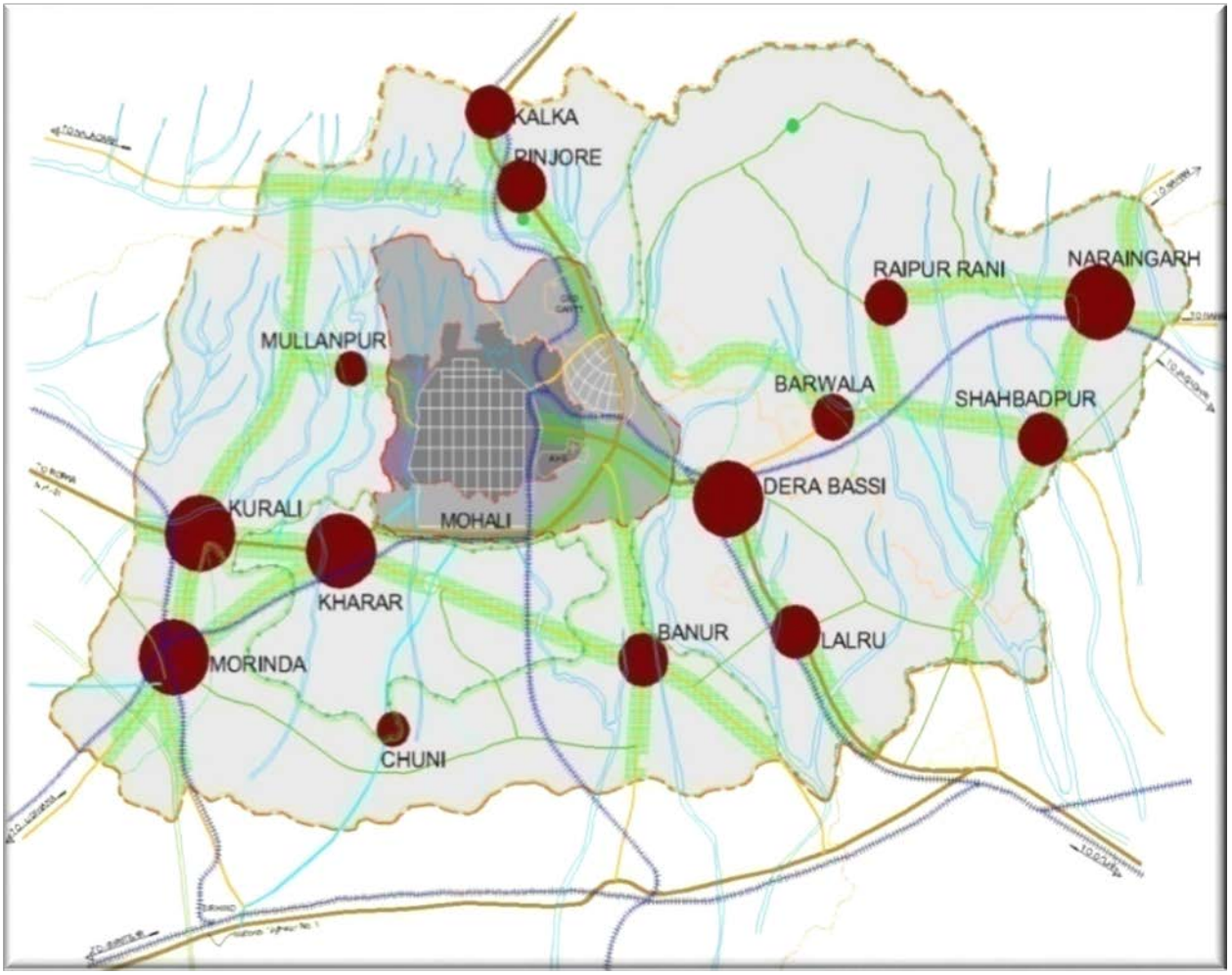
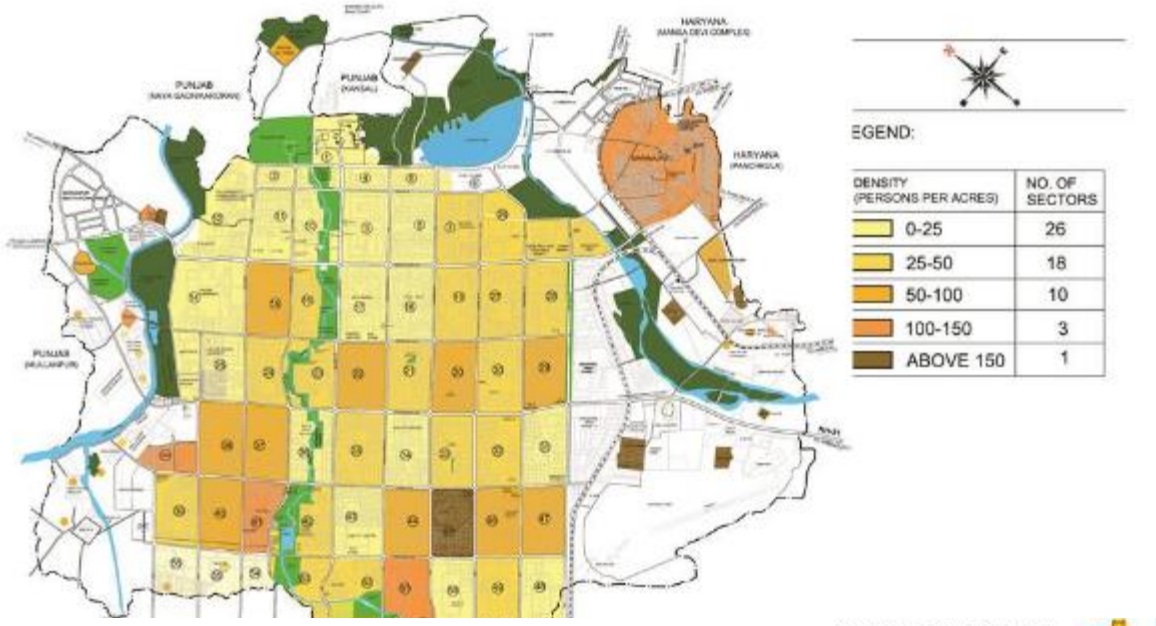
ANNEXURE-I


KALKA
PINJORE
RAIPUR RANI
NARAINGARH
MULLANPUR
BARWALA
SHAHBADPUR
DERA BASSI
KURALI
MOHALI
KHARAR
BANUR
LALRU
MORINDA
CHUNI

ANNEXURE-II & III

(AS PER NOTIFIED CMP-2031)

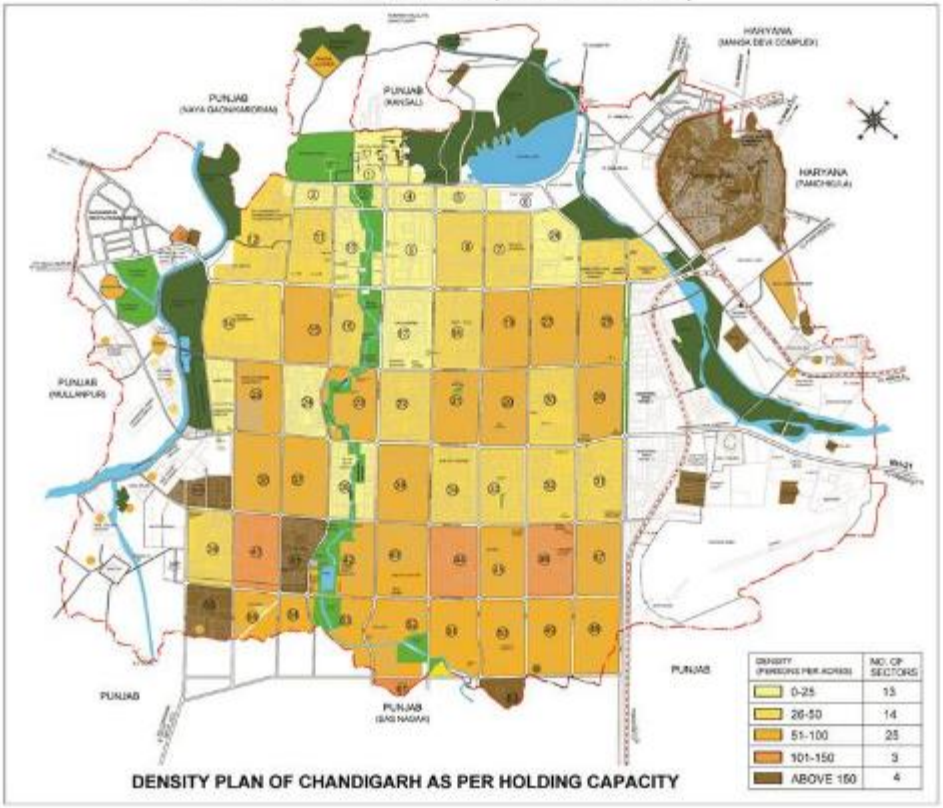
PLAN D2 - DENSITY PLAN OF CHANDIGARH (AS PER CENSUS -2001)



DENSITY (PERSONS PER ACRES)	NO. OF SECTORS
0-25	26
25-50	18
50-100	10
100-150	3
ABOVE 150	1

Chandigarh Master Plan – 2031

PLAN D3 - DENSITY PLAN OF CHANDIGARH (AS PER HOLDING CAPACITY)



DENSITY (PERSONS PER ACRES)	NO. OF SECTORS
0-25	15
26-50	14
51-100	25
101-150	3
ABOVE 150	4

DENSITY PLAN OF CHANDIGARH AS PER HOLDING CAPACITY

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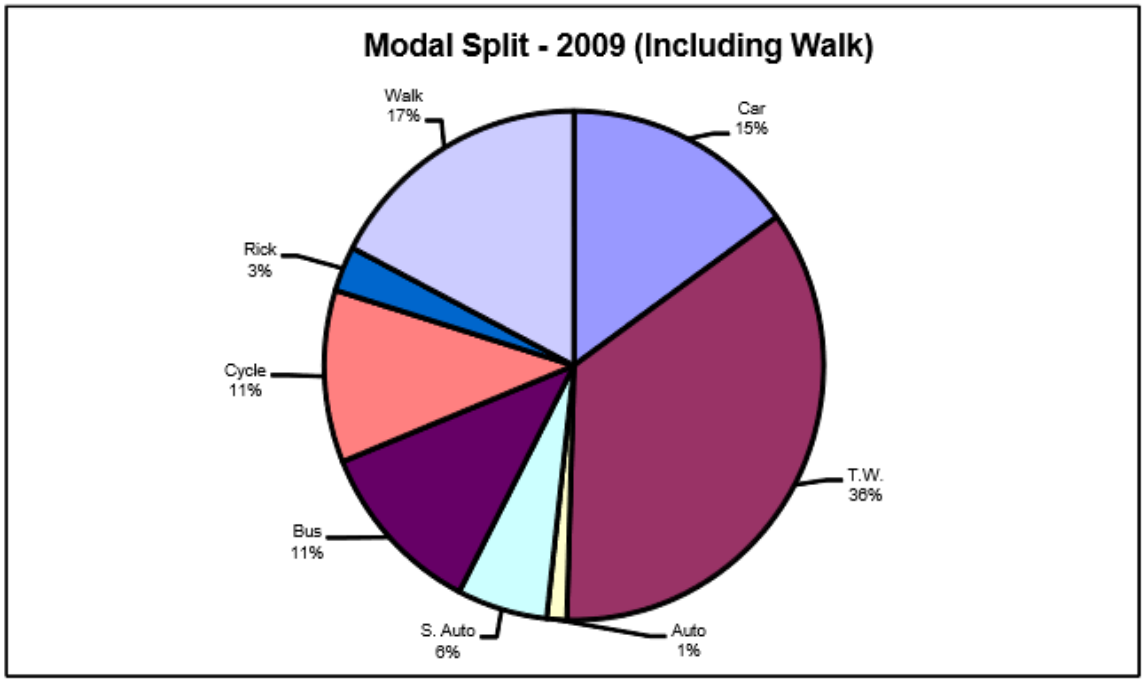
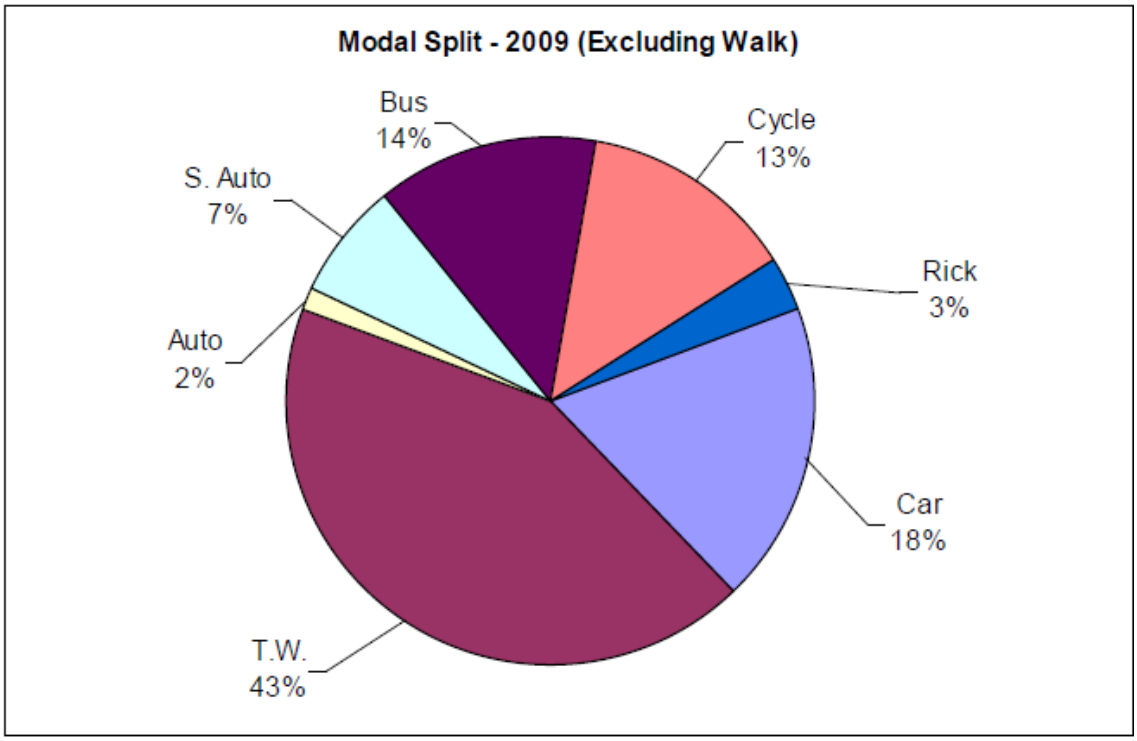
ANNEXURE IV

(AS PER CMP 2009)





Chhattisgarh

Introduction

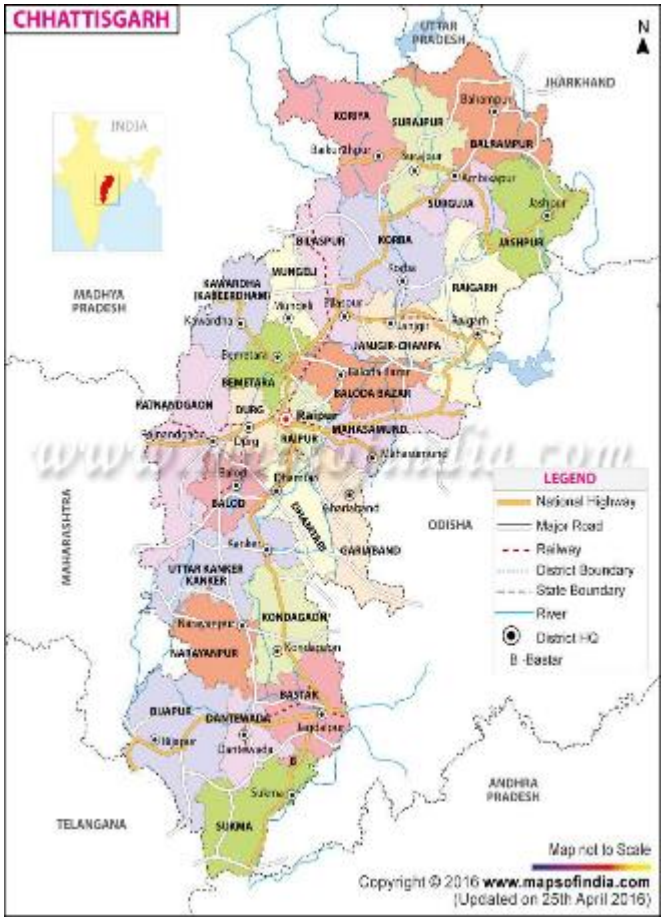
Mobility is inextricably linked to growth and development of the society. Mobility provides multi-dimensional perspectives for addressing movement of both people and goods. Proper solutions need to be provided for all types of road users and environmental concerns.

NITI Aayog has taken steps towards formulating an inclusive policy on transformative mobility in India. In Chhattisgarh, a state specific strategy has been formulated based on valuable insights provided by NITI Aayog.

State at a Glance

Chhattisgarh came into existence as a new state on 1st November 2000. The State has an area of 135,191 km2 and a population of 25.5 million as per 2011 census, of which 19.6 million is rural and 5.9 million is urban population. 45% area is covered with forest. Administratively, the state has 27 districts and 13 municipal corporations.

The state is rich in minerals like iron ore, coal, dolomite, limestone, tin ore etc. Raipur, Dantewada, Kanker, Durg, Balod, Baloda Bazar, Bilaspur, Janjgir Champa, Raigarh, Korba, Korea, Surajpur, Ambikapur are major mining and industrial areas in the state.



Vehicles Overview

1. The number of registered vehicles in the state is appx 60 lakh.
2. Almost six lakh vehicles are getting registered each year.
3. Almost 80 % vehicles are two wheelers.
4. State has more than 3 lakh private cars.

Buses and Autos

1. **City Buses:** 507 buses in NRDA/ Nagar Nigams/9 Urban clusters across the state.
2. **Routes:** 375 routes designated as city routes for city buses
3. **Major Cities:**

- Raipur: City Buses 196, Autos 11500
- Durg/Bhilai: City Buses 81, Autos 2000
- Bilaspur: City Buses 50, Autos 7000

4. **Private Buses:**

Approx. 750 Private Buses on Inter-State routes

Approx. 7000 Private Buses on routes within State

5. **Autos:** Approx 40000 in the State

BRTS (Raipur & Naya Raipur)

City Bus Services

Air Ways

1. Raipur Airport is well connected
2. Airport at Jagdalpur is in the process of development for enhanced regional connectivity
3. Airstrips at Bilaspur, Surguja, Jashpur,Nandini & Raigarh

Railways

1. Mumbai- Howrah Line connects some major district of Chhattisgarh like Rajnandgaon, Durg, Raipur, Bilaspur, Janjgir Champa, Raigarh.
2. Districts Jagdalpur, Korba,Korea, Surajpur and Ambikapur, Dantewada also have trains operating mainly for carriage of goods.

Vision

To have a efficient, safe, automated, national benchmark comparable, transport infrastructure in Chhattisgarh and to ensure revenue generating, customer-focused, affordable and environmentally sustainable integrated transportation solutions. It shall aim to achieve inclusive growth, connecting regions, communities, and centres of industry, commerce, tourism and pilgrimage across state.

Objectives

Transport and Communication related activities are important in respect to Service Sector outcome. Smooth movement of public goods and hassle free public transport system is the backbone of good governance. A modern transportation system works as catalyst for growth oriented public economy and utility services. To achieve this target the Government of Chhattisgarh is taking initiatives so that following long term goals may be achieved:-

1. To promote road infrastructure support for transportation of goods and passengers.
2. To promote public transport and advanced quality of service.
3. To promote modern, energy-efficient and eco-friendly surface transport system.
4. To promote road safety and modern traffic management.

Mobility Analysis

Strengths

1. Not much traffic congestion in Urban Areas.
2. Low density of vehicles esp. 4-wheelers in rural areas.
3. Bigger cities coming up with sustainable modes of public transport like Public Bike Sharing, e-Rickshaws.
4. Bigger cities coming up with the projects like Smart Parking, Multi-level parking, etc. to overcome the issues of limited parking space in public areas.
5. Projects like Smart Roads are under progress which will improve the drainage issues on the roads, thus overcoming congestion issues during rainy season.

Weaknesses

1. Scarce Parking Space in Public Areas in cities.
2. Number of City Buses for Public Transport is inadequate.
3. Lack of Multi-modal hubs in Urban Areas
4. Major modes of Public transport like buses and auto-rickshaws are running on diesel, thus making significant contribution towards pollution in the cities.

Opportunities

1. Central Govt. is encouraging State Govts. to adopt sustainable modes of transport esp. electric vehicles. Cities have to provide charging infrastructure for electric vehicles in order to promote this initiative. Some bigger cities have started working towards providing the electric charging infrastructure.

2. Parking space constrains in the cities can lead to higher adoption of Public Transport, provided the connectivity issues are overcome.

3. Increasing prices of fuel will lead to citizens opting for public transport like City Buses, PBS, e-rickshaw, etc.

4. Introduction of Mass Transit Systems in bigger cities.

5. MoU signed between Raipur Smart City Ltd. and NIUA for providing technical assistance in projects like Comprehensive Mobility Plan (CMP), Multi Modal Transportation Management Strategy (MMTMS), etc.

Threats

1. Population of Urban Areas is increasing at a high rate.

2. Higher population is leading to increased number of registration of private vehicles which are contributing towards congestion and pollution.

3. Poor connectivity of public transport and lack of Multi Modal hubs in the urban areas is discouraging people to opt for public transport.

4. Project like Smart Parking, Multi level parking, etc. are focused in the Smart Cities as they are getting adequate funds from the Central and State Government. Other cities are still looking for the source of funding for these kind of projects.

New Initiatives and Good Practices

MoU between RSCL and NIUA (Completed)

1. A Memorandum of Understanding (MoU) has been signed between Raipur Smart City Limited (RSCL) and National Institute of Urban Affairs (NIUA) on 15th June 2018 for providing technical assistance for upcoming projects of RSCL under Smart City Mission.

2. NIUA will be providing technical assistance in projects like Comprehensive Mobility Plan (CMP), Multi Modal Transportation Management Strategy (MMTMS), Market redevelopment projects of Raipur, etc.

Raipur Smart Road (Under Implementation)

1. Dedicated utility trenches along smart road to make a clutter free organized infrastructure network.

2. Storm water drain network to avoid water logging

3. It will also includes Cycle track, green belt, median, wide footpath.

Multi Modal Integration (Proposal Under Review)

1. Proposal under consideration for making at least four Multi Modal Hubs in the Raipur City. These hubs will be having maximum footfall of commuters in the city.
2. Multi Modal Hubs will provide facility to reach various parts of the city in the shortest possible time through the combination of various modes of public transport.

Raipur Sky Walk (Under Implementation)

1. A dedicated walk way is under construction over GE road and Jail Road (one of the most congested roads of Raipur) which would minimize the pedestrian traffic on the main road.
2. It will provide easy mobility to pedestrians on these roads.

Dedicated Bicycle Tracks in Raipur and Naya Raipur (Implemented)

1. Dedicated bicycle tracks available in Raipur and Naya Raipur.
2. Physical barriers separate the cycle track from the main road.
3. RFP for Public Bike Sharing under progress in Raipur.

Electric Vehicle Charging Stations in Raipur (Under Implementation)

1. Electric Vehicle Charging Station will provide paid charging facility for e-rickshaws, e-bikes, e-buses, e-cars and other electric vehicles.
2. A few Charging Stations will also provide Battery Swapping facility in future.
3. Raipur is also considering restricting auto rickshaws on major roads

Bus Rapid Transit System (BRTS)

1. Naya Raipur BRT Infrastructure are robust and iconic in design.
2. Bus Depot and 12 Bus Stops are constructed and fully functional.
3. 30 nos of AC BRT Buses.
4. 13 BRT shelters and 9 feeder stop.
5. Avg. Ridership – 2604 per day.
6. Ridership is continuously increasing

Achievement: BRT at Naya Raipur

Reduction in Green House Gas Emissions -

Parameter	Monitoring Results (ug/m3)	Monitoring Results (ug/m3)
	June 2014	July 2017
SO2	21-22	21.4
NOx	29-34	21.3
CO	1065-1235	1262

Even though the pollution, number of the vehicles on the roads and construction activities are increasing, the ambient air quality has been more or less static.

Reduction in Air and Noise pollution

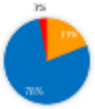
Parameter	Monitoring Results (ug/m3)	Monitoring Results (ug/m3)
	June 2014	July 2017
PM10	67-78	78
PM2.5	38-41	41.4

Opinion Survey for the Project

The Project has been well appreciated by the public in the opinion survey,

Overall Service

- 19% have rated it "Excellent",
- 78% have rated it "Good"
- 3% have rated it "Fair".



Reliability

- 80% have rated the service "Reliable".
- 20% have rated the service "Behind Schedule

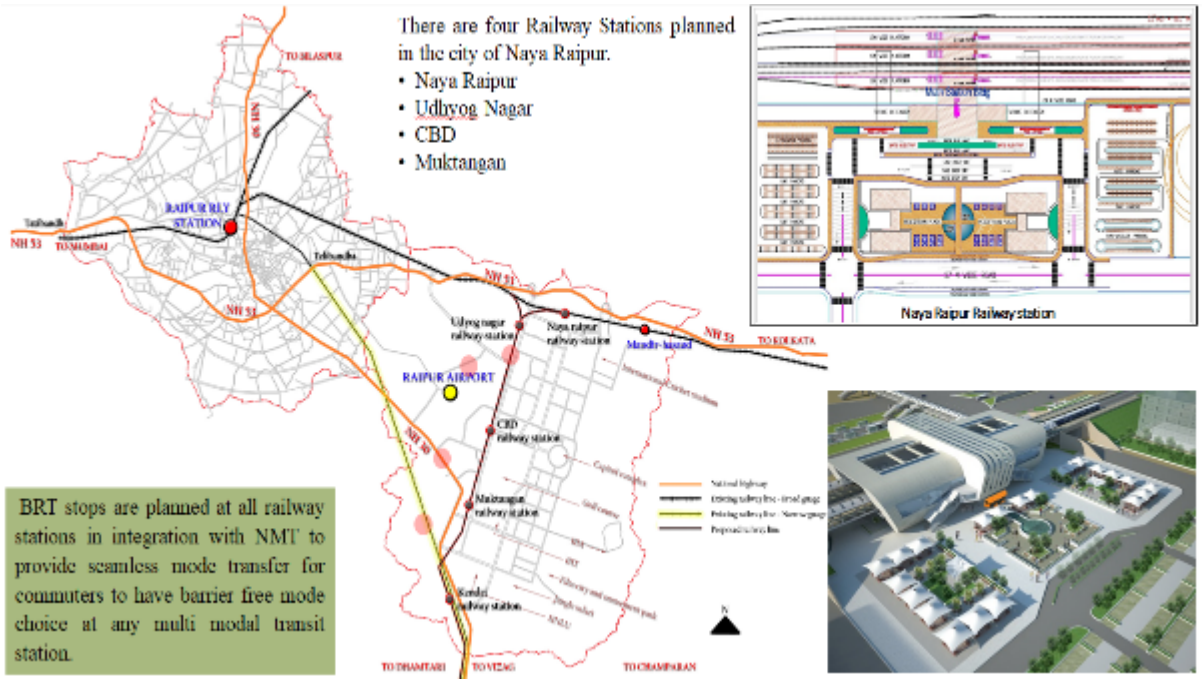
Safety

- 96% have rated as "Safe".
- 4% have rated as "Unsafe"

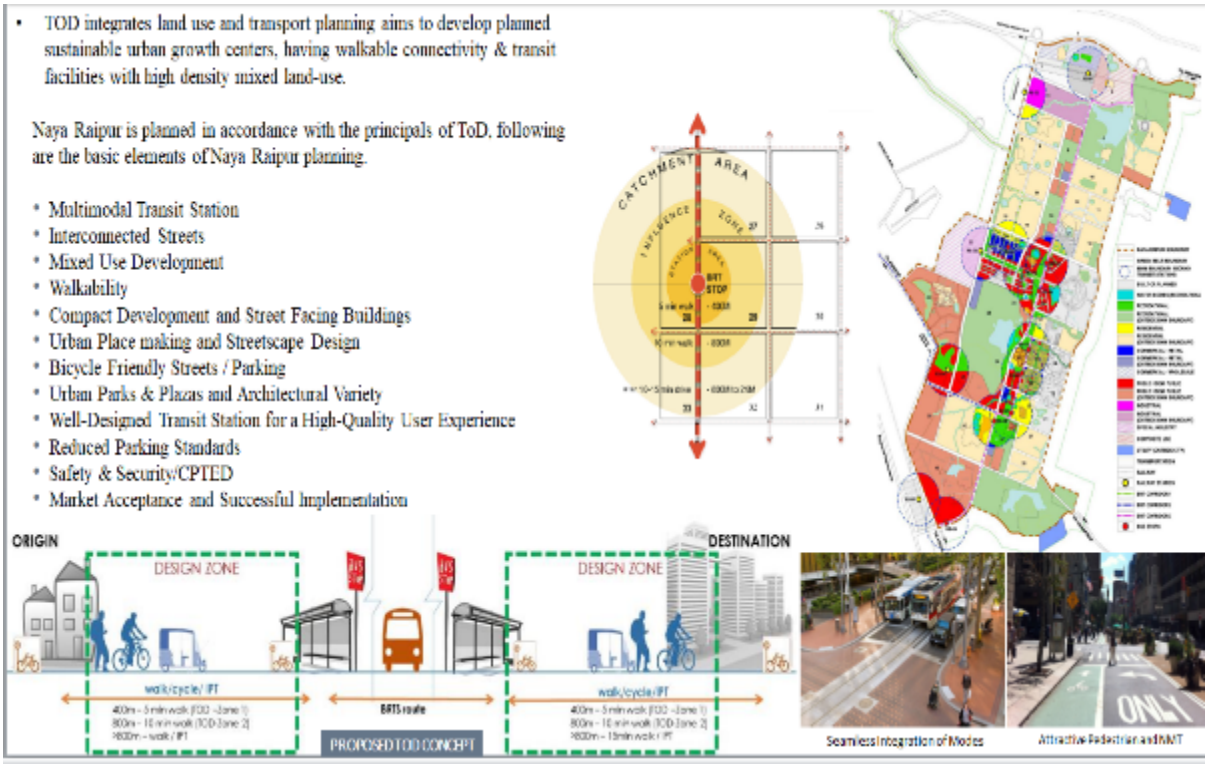
Access to the station

- 9% customer rated it as "Excellent"
- 88% of customers rated the access "Good"
- 3% customer rated it as "Fair"

Proposed Multimodal Transit Station

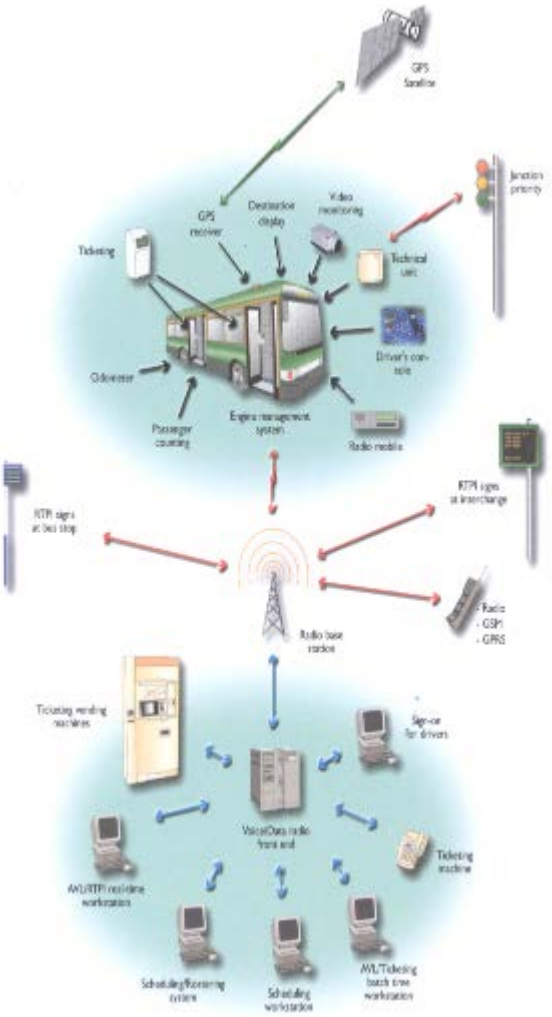


Transit oriented development: Elements

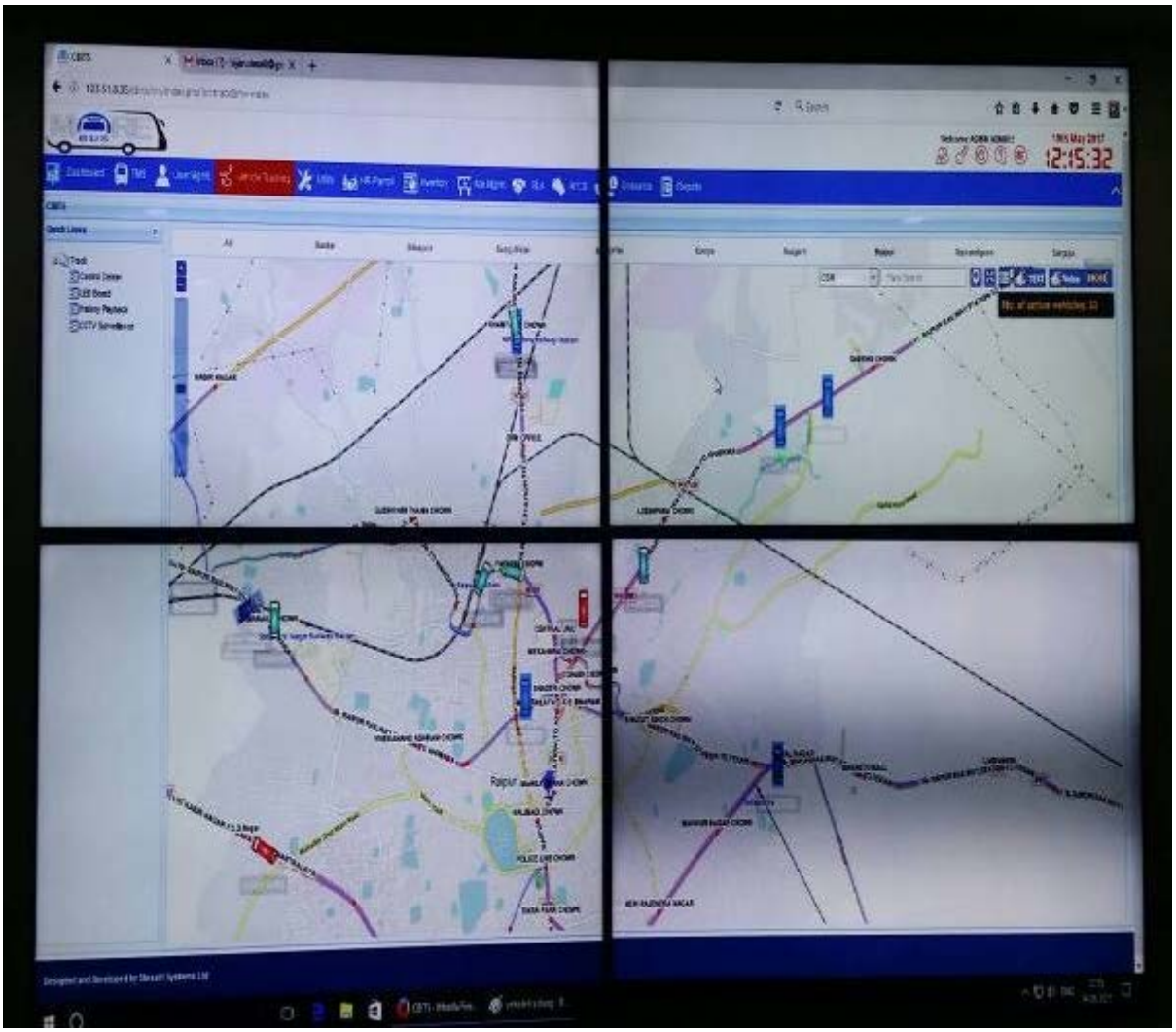


Use of IT

S.No.	Items
1.	Bus Tracking Control Unit (BTCU)—BTCU equipped with two way communication facility between crew members and Control Centre users.
2.	Bus Shelter Solution--Provides an added feature of Video Feed availability at Control Centre video wall via mobile gateway.
3.	Passenger Information System (PIS)- Display Board for Bus & Shelters—Display route information and estimated time of arrival of buses
4.	CCTV and MDVR for BRT Buses--Have Wi-Fi access to download data at the Control Centre/Depot. The system to provide 45days storage
5.	CCTV and DVR for Bus Shelter & Depot--Are connected via Mobile Gateway. Users in Control Centre/Depot are able to view Live feed (depending on Connectivity availability) using video management system
6.	ETM & FCS--The revenue reconciliation management on real time basis. Fare matrix and fare table gets update in real time basis
7.	Turnstile--have a digital counter, to record the counts in both directions and send counter update to the server via mobile gateway.
8.	RFID enabled Automatic Doors for shelters and bus—Help in reducing dwell time.



City Bus Intelligent Transport System (CBITS)



Intelligent Traffic Management System and Integrated Command & Control Centre (Implemented in Naya Raipur and under Implementation in Raipur)

1. Adaptive Traffic Control System will enable adaptive timing of the traffic signals depending on the actual traffic on the road. This will minimize the number of stops on a particular route and will smoothen the traffic flow.

2. Variable Message Signage System & Billboards will enable display of messages such as traffic condition on the route, delay along specific route, route diversion, etc.

3. Integrated Command and Control Centre (ICCC) will monitor, manage and provide rapid response to its stakeholders.

Integrated Command & Control Centre (Naya Raipur)

Mobility Strategy

1. Encourage shared modes of transport including Public Transport .
2. Improve the travel experience of the passengers on the public transport modes
3. Ensure safety and convenience of passengers in Public Transport
4. Introduce Sustainable and Affordable, Non Motorized Transit (NMT) modes of transit like Public Bike Sharing, e-Rickshaw, etc.
5. Introduce Mass Transit System like Light Rail Transit (LRT) and Bus Rapid Transit (BRT). E.g. Introducing LRT between Raipur and Durg.
6. Implement Intelligent Transport System for live tracking of city buses and providing information to the citizens about bus routes, timings, etc. in real time through mobile app.
7. Land use adjustments and densification of corridors along mass transport corridors.
8. Provide better road drainage and maintenance system
9. Introduce Smart Parking and Multi Level Parking for decongestion of public places
10. Developing Multi Modal Hubs for better connectivity inside the bigger cities

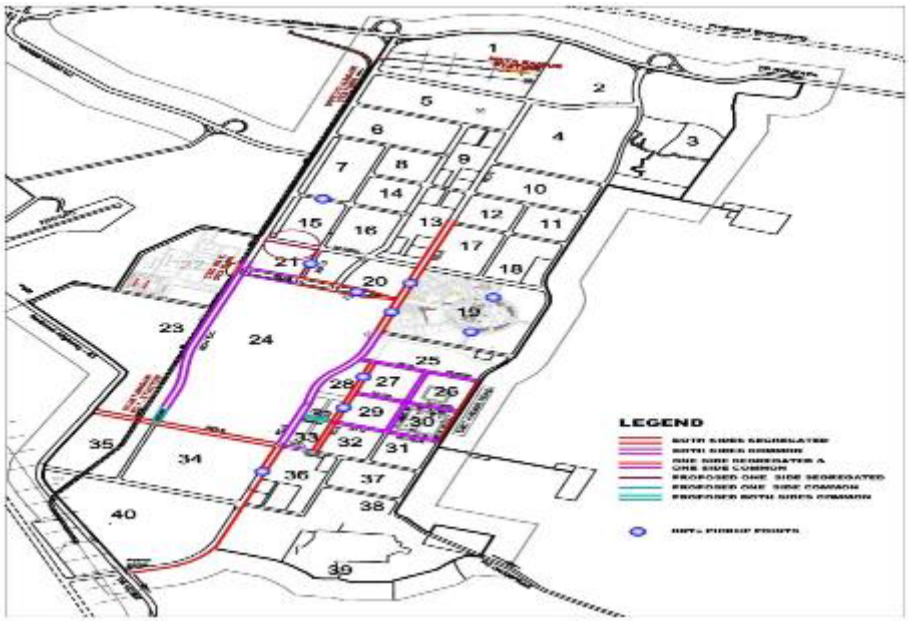
Sustainable Mobility

1. As per the MoUD Traffic and transportation study, the average ridership for a city of population less than 5 lakhs has been projected to be 10 lakh trips per day and is projected to increase to 17.2 lakhs by 2031.
2. In Raipur, the ridership per day in the City Bus system is 2,00,000 per day. This has scope for rapid increase.
3. With rapid growth of population and increased forecasted ridership in the future, mobility poses the greatest of environmental challenges. Increasing number of public and private transport modes are leaving their permanent mark on the environment.
4. One of the major focus of Mobility Strategy is towards development of Sustainable Mobility Solutions
5. In the state of Chhattisgarh, we can have majorly 3 sustainable modes of transport which can, at the same time, also help reduce traffic congestion and pollution:

- Public Bike Sharing
- E-Rickshaws/Electric Vehicles
- Pedestrian Lanes

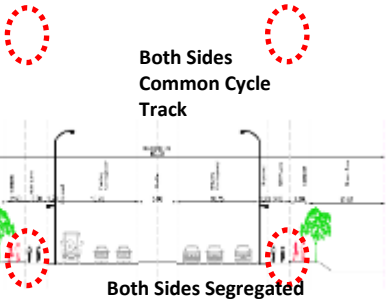
Public Bike Sharing

1. Public Bike Sharing (PBS) projects have been carried out by multiple cities as part of the Smart City proposal implementation.
2. These cities are encouraging this mode by making it available at multiple spots in the city and at a very affordable cost.
3. Separate road marking have been done for providing dedicated lane to the bicycle riders.



Public Bike Sharing: Cycle Tracks and Pedestrian Walkways-City Level

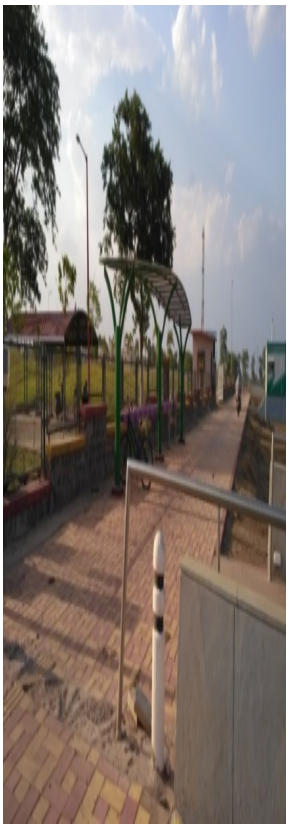
Common Cycle Track



Both Sides Common Cycle Track

Segregated Cycle Track with Footpath

Both Sides Segregated Cycle Track with Footpath



IBRD Loan	NRDA
Cycle Track - 38.61 km Pedestrian walkway - 28.53 km Table top crossing - 2.78 km	Cycle Track – 11.10 km Pedestrian walkway–16.80 km

The experience is being replicated in sector development from NRDA own resources

Public Bike Sharing Scheme has been initiated to provide End mile connectivity-With10 PBS Shelters in 1st Phase, 120 bicycles, smart ticketing system

Shared Mobility

Objective is to provide public with shared modes of transport and reduce the dependence on private transport

1. Three wheelers

- Important mode of transport in cities and growing rapidly in rural areas.
- Offer employment opportunities to small entrepreneurs.
- Efforts are made at districts level to regulate movement.
- Auto policy is formulated by the transport department.
- E-vehicle need to be encouraged.

2. Taxi

- Taxi aggregator policy has been formulated.
- Efforts will be made to encourage more number of taxis. Commercial use of private vehicles without taxi registration needs to be discouraged.
- Three wheeler and two wheelers taxis to be encouraged.

3. City Buses

- For efficient operation, Urban Transport Societies under chairmanship of district collectors have been formed, each looking after a cluster of cities.
- Urban bodies/Society ensure most efficient and economic citizen friendly use of city buses.
- City bus operation would be expanded to the areas suitable for public Transport.

4. Private Buses

- Transport Department should ensure proper operation of passenger buses both on interstate and intra state routes.
- Safety, comfort and proper availability should be maintained.
- Fast , non-stop , AC buses on key route have started.
- Use of GPS tracking for information and safety of public is proposed.

E-Rickshaws/Electric Vehicles

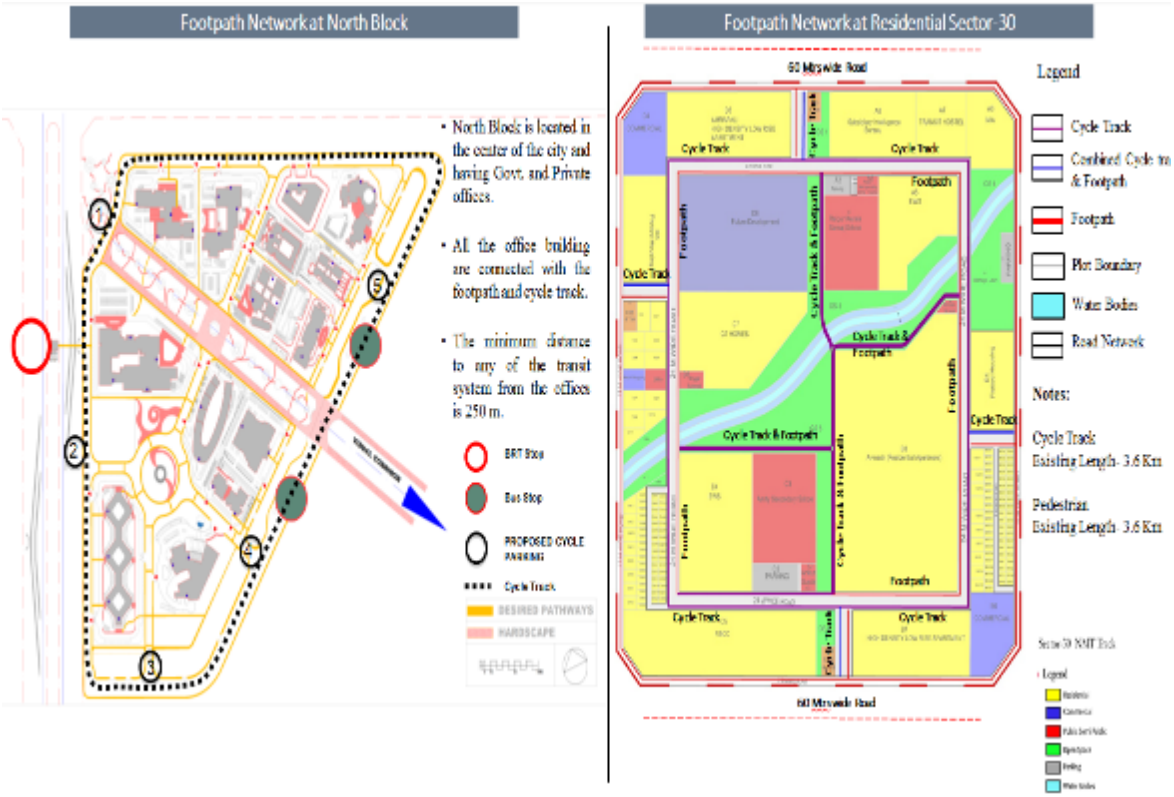
1. Major cities are slowly moving towards making E-rickshaws as the preferred mode of transport for short distances and reducing the count of auto-rickshaws.
2. Road tax exemptions has been granted to the e-rickshaw owners.

3. Bigger Cities are also working towards developing the charging infrastructure for electric vehicles in the city.

4. Suitable charging places will also be developed for increasing no of Electric Vehicles

5. Facilities for changing batteries will also be developed as per the future requirements.

Pedestrian Walkways:



1. Major cities are planning towards creating wider pedestrian lanes

2. Cities under smart city mission are implementing several projects like Smart Roads, etc. wherein the space of pedestrian movement has been specially taken care of.

3. Raipur is implementing a Sky Walk dedicatedly for the pedestrians on one of the major road in the city.

Rural and Last mile connectivity

1. Efforts are being made to expand the transport network and availability of shared mode of transport in remote and rural area.

2. Tax incentives and other concession may be granted to encourage such connectivity

Citizen centric practices

1. Suitable provision for disabled, women and elderly people have been provided in public buses.

2. Travel concession for certain categories of passengers including sick, differentially abled and elderly has been provided.

Building Infrastructure

1. Bus terminals/ stands and stops with proper facilities (including public information system) are being developed .
2. Adequate provisions for bus lay bys and drivers rest along major roads.
3. Shifting of bus terminals from crowded areas.
4. Transport Nagar for goods vehicles at suitable places.

Parking

1. Adequate parking spaces need to be identified and developed.
2. Multilevel parking should be developed at suitable places.
3. Better use of existing parking places including removal of encroachments should be done.
4. Parking polices/No parking areas/ prohibition of certain type of vehicles etc. should be planned on the basis of the specific need of the areas.

Resource Mobilization

1. Smart Cities are getting funds from the State and Central government for implementing their projects under smart city proposal.
2. There are multiple projects being implemented by smart cities which will lead to safe, sustainable and affordable urban transport in these cities like Intelligent Transport System, Intelligent Traffic Management System, City Command and Control Centre, Smart Parking, Public Bike Sharing, Electric vehicle charging stations, Smart Roads, etc.

Conclusion

The vision envisaged and the strategy outlined can achieve its objectives only when serious efforts are made towards its implementation. Transformative mobility opens up a range of new opportunities for economic growth and employment generation. All the stakeholders and concerned departments are required to work with synergy, in the area of public transportation, environmental sustainability, rural and last mile connectivity and other aspects of transformative mobility.

Dadra and Nagar Haveli

State Mobility Strategy of
Union Territory of Dadra & Nagar Haveli

Introduction of the Union Territory of Dadra and Nagar Haveli (UT-DNH):

i. ***Geography*****:** It is located in the western part of the country and situated between the states of Gujarat to the north and Maharashtra to the south. It lies some 24 km from the Arabian Sea and about 130 km north of Mumbai. The total area of the Dadra Nagar Haveli is 491 Sq.Km and consists of two parts Dadra and Nagar Haveli which together embrace roughly 72 villages. Silvassa, the capital town has an Urban Local body and has been declared as a smart city. The terrain is undulating and hilly, reaching elevations of 1,000 feet (300 metres) in the northeast and eastern part of the territory near the Western Ghats. Lowland areas are limited to the central plains, which are traversed by the Daman Ganga River and its tributaries. The only navigable river in Dadra and Nagar Haveli, the Daman Ganga rises in Maharashtra and flows northwestwards through the territory toward Daman, a port once famous for its docks. The climate is typical of the region. Summers are hot, with the mean temperatures in May typically rising into the low 90s F (mid-30s C). Annual rainfall averages about 120 inches (3,050 mm), most of it received during the southwest monsoon season.

ii. ***Population*****:** As per census 2011 :3,43,709

iii. ***Urbanisation*****:** Over the years number of industrial units have been set up in the DNH region owing to its accessibility to industrial hubs like Vapi, Surat and Mumbai etc. and further encouraged due to the tax concessions declared. Rapid industrialization had led to employment generation, but resulted in unplanned urban development. Employment generation had also resulted in migration from other states. The region is experiencing steady growth in population. The urban population has increased from 17.77% (1991) to 22.89% (2001). There has been steady shift in demographic profile of the region. Decline in household size and sex ratio implies presence of single migrants, mainly contributed due to industrialization. Industrial development trend is found to be unorganized within the region, as no regulatory control was implemented for selection of site for establishment of industries. This led to unmanaged and scattered growth of industries causing difficulties to provide necessary infrastructure within the vast DNH region, because of which tremendous pressure is exerted on environment. This environment as mentioned earlier consists of a large area under forest jurisdiction, which is also scattered in DNH region thus increasing the complexity of causing many areas that are not in forest jurisdiction becoming rather discontinuous pockets of lands. Urbanization with poor infrastructure development is the reason for most of the environmental issues. There may be ecological and social imbalance as well, as a part of environmental hazard and economic imbalance. To overcome these problems proper land use policy is required with provision of well integrated infrastructure like water supply, sewerage, drainage, transportation (with due attention to green infrastructure and streetscape development within the road's ROW), etc.

iv. ***Density*****:** The population density remains at 700 persons per Square Kilometre. According to Census 2011, it has a population of 3.44 Lakhs, an expansion from 2.20 Lakh in 2001Census. The aggregate population growth in this decade was 55.88% while in earlier decade it was 59.20%. The number of inhabitants in Dadra and Nagar Haveli frames 0.03 percent of India in 2011. In 2001, the figure was about 0.02 percent.

v. ***Number of Vehicles (mode wise)*** :

S. No.	Mode of transportation	Number of Vehicles
1	Stage carriage (Bus)	72
2	GSRTC Buses	140(Trips)
3	MSRTC Buses	08 (Trips)
4	School bus	41
5	School van	02
6	Taxis / Cabs	320
7	Auto-rickshaws	440

Vision for Transformative Mobility:

"Provide mobility to all and cover all the villages of DNH through sustainable transport network of low carbon emission".

Objectives for Mobility:

- Develop alternative fuelling infrastructure and to transform the existing fleets of buses into CNG and electric, etc.
- Promote electric vehicles and ensure charging points are situated in visible, accessible and reliable locations with minimal route diversions to access them,
- Promote accessible and safe cycle and walking routes to encourage walking and cycling for short journeys for commuting or leisure to reduce carbon emissions, congestion and improving air quality and health.
- Provide Effective and efficient transport network
- Maximise the travel choices and mode of transport
- Protect the transport users and the environment
- Improve road infrastructure network
- Decongest roads and highways
- Better access to public transit
- Improve air quality
- Reduce traffic fatalities
- Adopt technology to enhance mobility
- Promote Awareness
- Improve employment opportunities

Situational /SWOT analysis of the existing Mobility scenario:

i. Review of existing transport systems (roadways) for urban and rural areas (with focus on public transport) :

The total road length of the road in Dadra Nagar Haveli is 917 kms approx. including All Weather Motorable Roads along the Mumbai-Ahmadabad Highway. Proposed Mumbai-Vadodra Express Highway is passing through Dadra & Nagar Haveli. It is Adjacent to Delhi- Mumbai Railway line. Nearest railway station is Vapi, which is about 13 kms from Silvassa. The public transport is the major mode of transport as Gujarat State Road Transport Corporation (GSRTC) and Maharashtra State Road Transport Corporation (MSRTC) buses ply 140 trips and 8 trips respectively besides 72 stage carriage buses. Auto rickshaw and taxi cabs are plying in DNH, which provides the last mile connectivity. Two wheelers and four wheelers (LMV) are the private transport vehicles and majority of the population are dependent on them for commuting in DNH. The Silvassa Bus Depot located at the centre of the city is proposed for redevelopment with commercial facilities through PPP model.

For Buses	
Strength: a. reduce personal vehicle usage & help in promoting clean air b. creates less noise pollution and lowers parking demands on congested city streets c. lower rates of road rage and potentially fewer accidents d. Most buses are larger, newer, and more structurally safe than smaller automobiles or vans	Weaknesses: a. Buses owned by OIDC are running at losses b. Buses running under Contract do not strictly follow fare rules, safety rules, avoid less-profit making routes, indulge in cartelisation and over-crowding. c. Over charging by contact bus owners. d. Non-maintenance of cleanliness and servicing standards
Opportunities: a. Re-routing of existing buses b. Installation of GPS system in buses for real-time monitoring c. Phase-wise introduction of e-bus on various routes d. Introduction of e-payment system	Threats: a. Contract bus owners refuse to ply in remote hilly areas due to lower margins. b. Tampering of GPS system in buses. c. Opposition towards proposed changes by the administration. d. Industrialists – Politicians nexus for vote bank politics.

For Autorickshaws and e-rickshaws	
Strength: a. Door to door connectivity b. Comparatively cheaper than taxi c. Being smaller in size, takes less space on roadways and parking areas	Weaknesses: a. Auto-rickshaws generate more pollution than many other forms of transportation b. efforts to convert auto rickshaws to run on natural gas did little to reduce

d. possible to run on electricity or to install more efficient engines, which can significantly decrease their fuel consumption e. don't require as many resources to manufacture as an automobile, because of their compact size and limited complexity	pollution because of their inefficient, two-stroke engines c. Generates a lot of noise. d. E-rickshaw need frequent recharging e. Cheaper e-rickshaws use lead battery which is not environment friendly. Li-ion batteries are expensive and most local manufacturers do not import it to keep production cost low. f. Lack of charging stations
Opportunities: a. Installation of GPS system in buses for real-time monitoring b. Phase-wise introduction of e-rickshaws on various remote locations c. Introduction of e-payment system using digital meters d. Employment generation	Threats: a. lack important safety features, such as seat belts and doors. b. Their ability to travel at moderately high speeds creates a significant potential for injury. c. often violate traffic rules and are often without a license plates d. do not use digital meters for fares e. Strike against any proposed changes by the administration. f. Industrialists – Politicians nexus for vote bank politics.

For School buses and Vans	
Strength: a. Reduce the use of private vehicles by parents and children to reach educational institutions which reduces traffic congestion and pollution. b. Economical as it saves both parents and institution's money c. Safe as children will travel straight from home to institute and back.	Weaknesses: a. Violating the rules as per motor vehicle act b. Lack of proper maintenance and servicing c. No CCTV cameras and GPS system d. No First aid box e. No road safety course in school / college curriculum
Opportunities: a. Road safety week conducted by the Police department with the help of Transport and Education department. b. Parents and School management can be directed to ensure that the safety of their wards is not compromised c. Special sessions on prevention of sexual harassment by experts in educational institutions. d. Panic button	Threats: a. Overcrowding in vans b. Instances of sexual abuse by drivers and conductors c. Rash driving by van drivers d. Unauthorised use of private vehicles as school vans violating all laws. e. Untrained drivers not having mandatory experience as per motor vehicle act.

ii. ***Mapping the existing centres of economic activity and the current travel patterns*** **:**

The industries and industrial estates/zones are the major centres of economic activity besides the commercial areas in Silvassa town. All the Industrial areas have been connected well through transport network and regular bus services are available to such centres. Besides, public transport, the major industries are having contract carriage buses for transportation of their employees. A sizable workforce uses two wheelers for commuting and there exist a small population who uses cycle as a mode of transport. All the market places, commercial and educational institutions are connected with transport network.

iii. Analysis and Indicators (Comparison with Benchmarks):

a. Indicators for mobility and accessibility:

S.No.	Indicators	
1	Reasonable travel time in minutes/km	NA
2	Perception of lost time in minutes/km	
3	Degree of unexpected delay in minutes/km	
4	Physical condition of the transportation system	
5	User travel cost in Rs/km	

b. Infrastructure and land use :

There is no state owned transport corporation. However, the Sarathi bus service is run by Omnibus Industrial Development Corporation (OIDC) with a fleet of 16 buses of which 6 each are plying DNH and Daman, and 4 are plying in Diu. Otherwise, all the public buses for inter-state travel are from GSRTC and MSRTC. For local transportation, the details are mentioned in the table at para 1(v).

S.No.	Indicators	
1	Land Parcels allocated to Department of Transport	Three
2	Area of land (in sq. m))	102 Sq.m (at different locations)
3	Current use of land	Use for bus-stand, mini bus stand at Silvassa Use for RTO office premises One land is lying vacant

c. Safety and security:

The law and order situation in DNH is very good and people feel secured. However, the Department of Transport in coordination with District Administration and Police Department take appropriate steps to ensure the safety of passengers in public vehicles. Foot board travel and travel by sitting on the roof of the bus in village areas is strictly controlled. Violation of traffic rules and motor vehicle rules are severely dealt with, to enforce discipline among transporters. Though, the situation is under control, it is necessary to go for Integrated Traffic Management System (ITMS) as a smart option. Regular Awareness and outreach programmes are organised to create understanding among the public particularly students and youth on importance of safety, obeying traffic rules and signals, the best practices and Dos and Don'ts while driving and travelling. Signages and hoardings have been placed at important locations to drive home the safety needs. The following awareness programmes are regularly conducted as part of Road Safety Week.

S.No.	Programme	Location
1	Motor cycle rally to promote helmet wearing	Police HQs, Silvassa
2	Awareness programme for cyclists.	Silvassa
3	Distribution / Installation of reflector on cycles through industries & Schools	Department of industries, Silvassa
4	Medical Check-up & Fitness Team for drivers, Blood Donation Camp	Police HQs, Silvassa

For surveillance, CCTV Cameras have been installed at all important entry and exit areas both by Police department and Transport Department.

Police department has increased enforcement on Drunken driving, Minor driving, School vans moving without safety norms, strictly use helmets & over speeding in DNH. Breath analyser and movable barricades are provided in DNH. E-challan have been introduced and the number of challans increased as compared to last year for violation of traffic rule.

b) The school buses are directed to install GPS as a Mandatory requirement for registration and Fitness.

d. Environmental impacts:

The number of vehicles in the territory has increased over the years due to rise in industrial activity thereby increased the vehicular pollution level. All the Vehicles are running in conventional fuel and the autorickshaws are switching over to CNG. Though, the ambient air qualities in all the locations are good, the vehicular pollution will be a cause of concern. All the Roads having median are planted with shrubs and hedges to improve the green cover to absorb the PM 2.5. Besides median plantations, road side plantations with tree species have been taken up to improve the green cover.

e. Economic impacts:

Mobility plays a major role in the economy of DNH as most of the work force depends on public transportation to go to their work place particularly the industries. Nearly

63% of the population of DNH consist of tribals who live in villages at remote locations and travel to cities for various purposes. Their children also go to schools at distant locations. It is difficult for them to pay the requisite fare. The department is working in this direction to rationalise the fares.

iv. ***Identifying the Opportunities*:**

There is a wide scope for improvement of the public transportation scenario in DNH which include improvement in road infrastructure, construction/redevelopment of Silvassa bus-depot, improvement in parking areas, improvement in traffic signals, pedestrians/foot over bridge for walkers, converting the existing buses to CNG, introducing e-buses, e-rickshaws, charging stations for e-bus and e-rickshaws to promote low emissions, and setting up of Integrated Traffic Management System that will address all monitoring and safety measures, and rationalisation of public transport fares.

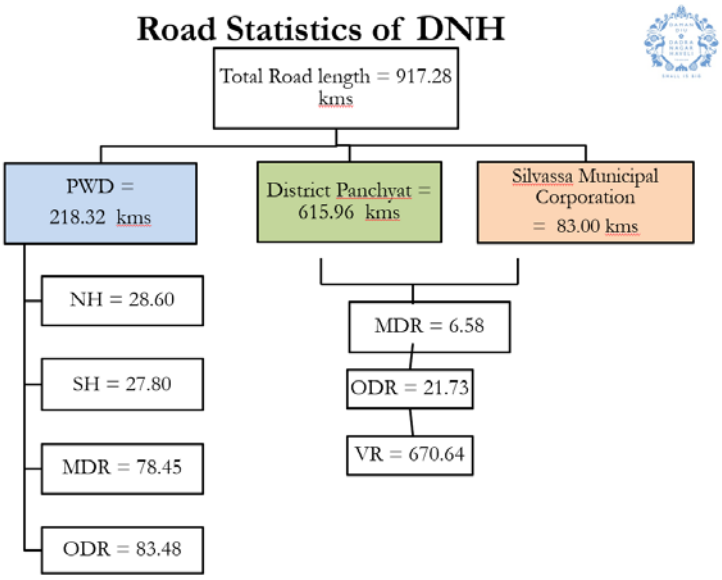
v. Identifying the challenges & issues related to Mobility: (including manpower constraints and regulatory issues :

As the geographical area of the DNH varies from hills to plains, the challenge lies in the reachability and suitability of the vehicles to provide door to door transportation facilities. Connectivity and frequency of transport services in remote areas as the same is not profitable since the number of persons availing the transport facilities are less. Though at preliminary level, it seemed feasible that e-rickshaws are suitable to run in remote areas considering their limited seating capacity but the roads (though in good condition) in hilly areas are too steep and these vehicles have low torque to carry the load. Also, is a problem of continuous electricity supply in these remote areas that is needed to charge the batteries of e-rickshaws. The solution to this issue is e-bus. Low capacity e-bus would be suitable to run in these areas.
There is a manpower shortage in the Department of Transport (DNH) to carry out effective regulatory functions. This makes the entire process right from the designing of policy formulation to implementation, enforcement and monitoring very difficult.

Identifying key Strategic levers for transforming mobility:

i. ***Expanding / Enhancing the network infrastructure for various modes (road, rail, air, waterways):***

The detailed road network of DNH territory is presented below.



The UT administration of DNH is continuously striving to make road transportation better by building new roads, bridges and widening/ beautification of existing roads. Other major infrastructure required for enhancing the mobility include.

- Development of bus-stand
- Development and modernisation of check-posts (Weigh-in-motion)
- Identification and development of parking infrastructure
- Improvement of traffic islands to reduce congestion
- Installation of surveillance cameras and traffic signals
- Renovate bus-shelters and make them user friendly

ii. ***Shared Mobility (including public transport systems, taxis, 3 wheeler autos etc)*:**

The existing shared transportation system includes stage carriages, contract carriages, school bus, school van, taxi/cabs and auto-rickshaws. The proposed shared transportation systems include e-bus, e-rickshaws.

iii. ***Intelligent Transport Solutions (ITS) and Digitization* :**

A proposal to set-up Integrated Traffic Management system (ITMS) or ITS is under preparation.
ITS is a well-known method to simplify or minimise traffic problems. It aims at achieving traffic efficiency, reducing environmental degradation, energy conservation, reduction in travel time, enhancing comfort and safety of the travellers. The components of ITS consists of Data collection, Data transmission, Data analysis and traveller information. ITS is already implemented on pilot basis at Delhi, Chennai,

Pune, Bangalore etc. Its backbone is effective usage of information and communication technology (ICT).
Under Digitization, all the payment related process is completely online (Vahan 4.0) and the details are up at www.digipay.gov.in.

iv. ***Zero Emission Mobility*** **:**

- Promote e-rickshaws and e-buses to achieve Zero emission. As a pilot project, ten e-rickshaws have already been purchased.
- The charging points for electric vehicles needs to be set up in the urban as well as rural areas.

v. ***Renewable Energy Sources*** **:**

- It is proposed to install solar charging points at few locations.

vi. ***Non-motorized Transport/ Pedestrian facilities*** **:**

- Development of footpath for pedestrians: It is proposed to declare vehicle free areas particularly in important market and commercial places in Silvassa to encourage walking as a mode of commuting.
- Introduce and expand cycle hiring scheme to promote non-motorised transport.
- Development of cycle stand and track

vii. ***Inclusive Mobility*** **:**

Ramps have been provided in public offices, schools, etc for people with mobility impairments but their special needs have to be accommodated in the design of transport infrastructure. Necessary intervention will be considered to take full advantage of roads, sidewalks and other transport facilities by the challenge differentially abled in future. Features such as textured pavements, curve/gradient slopes to easily get in pedestrian areas will be provided. Possibility of installing audible crossing signals at important junctions will be explored.

viii. ***Transport Oriented Planning*****:**

- The issue has been addressed in the Silvassa Municipal area as part of smart city.

ix. ***Freight Movement*****:**

The freight movement is not a major issue and largely through road restricte with in the territory. The DNH is close to Mumbai –Ahmedabad National Highway and Kandla and Mumbai Ports. Rail connectivity is also there and the nearest Railway station is Vapi.

x. ***Mobility Financing & Entrepreneurship*** **:**

The Department of Transport informally arranges meeting between the banks and entrepreneurs who wish to work in the direction of promoting zero-emission mobility.

xi. ***Rural Mobility & Farm Logistics*** **:**

All the villages are connected by public transportation to carry men and materials from agricultural field to markets in the city.

xii. ***R&D and Advanced Manufacturing*** **:**

Survey is undertaken to understand the traffic flow and congestion hotspots. Sensors have to be installed in Silvassa Municipal area to assess the traffic flow on real-time basis. Any industry which wants to put up R&D advanced manufacturing unit in the territory will be facilitated and encouraged as per the existing policies and schemes.

xiii. ***Employment & Skilling*:**
To improve the employment in Transport sector free driving training is provided for the youths and the same will be scaled up. Similarly, training on automobile repairing and workshop related trade will be included under skill upgradation. Skill gap analysis pertaining to transport sector will be conducted and the skills so identified will be included as a trade in skill upgradation training.

xiv. ***Cyber/ Data Security & Safety Mechanisms* :**
The data security and safety mechanism will automatically be included in ITMS once implemented.

State Action Plan:

S.No.	Key Action Areas	Implementing Agencies
Medium term strategy :		
1.	Integrated Traffic Management System – GPS, Smart payments, Safety & security systems etc.	Department of Transport, Department of Information Technology in PPP mode
2.	Introduction of e-bus and e-rickshaws , Setting-up of e-bus and e-rickshaw charging stations (Three year phase-wise project)	Department of Transport, Distt. Rural Development Agency (DRDA
3.	Redevelopment of bus depot in Silvassa	Department of Transport PPP mode (DBFOT)
4.	Improve the highway/road infrastructure network	PWD/RD/UD
5.	Modernise the RTO check posts	Transport
6	Inclusive mobility	PWD, Municipal Council and Police
Short-term strategy :		

1	Increase in public transport	Department of Transport
2	Promote shared transport	Department of Transport
3	Development of traffic island at important junctions in the municipality area to reduce the congestion and improve the traffic flow.	Department of Transport and Silvassa Municipal Corporation
4	Limit high-mileage polluting vehicle on road.	Department of Transport
5	Strengthen PUC monitoring	Department of Transport and Police department
6	Promote electric mobility	Department of Transport and DRDA
7	Convert the existing stage carriage /contract carriage buses into CNG	Transport
8	Renovate bus shelters and make them user friendly	PWD, Municipal Council and RD
9	Ensure, Schools, Key locations, industrial areas and all the villages are covered with bus service	Transport
10	Improve the traffic islands to minimise congestion at junctions	Industries, Municipal Council, PWD and Police
11	Encourage more walking through improve pedestrian areas and wayside signages	Municipal Council
12	Introduce and expand cycle hire scheme	Transport and Municipal Council
13	Create cycle parking around market areas, commercial streets, etc.	Transport, Municipal Council and Tourism
14	Cycle training for school children to use cycle as a mode of transport	Transport, Education and Police
15	Expanding the existing local bus network	Transport

16	Create awareness on the transport options available to people for different journeys.	Transport and Police
17	Install sensors to assess the traffic flow in Silvassa Municipal area on a real time basis	Municipal Council

Proposed institutional and regulatory reforms :

Revision of Motor vehicle act of DNH as per revised Supreme Court guidelines concerning safety of school children

Conclusion:

The overall scenario of UT of DNH is constantly changing due to rapid industrial development, migratory working population and variation in financial capability of the public in general. This in turn has resulted in multiple challenges in the field of transportation. In order to face such challenges, the UT Administration has to constantly adopt new avenues of mobility and revise or amend the policies and rules. The strategies mentioned in previous pages gives a synoptic view of the planning that the administration of transport proposed for next three to five years to cope up with the dynamism of mobility concept.

Daman and Diu

Introduction

Transport is an important factor in the context of sustainable development due to the pressure it places on the environment, its economic and social impacts and its linkages with other sectors. Transport innovations most profoundly influence the pace and growth of economic development of a country or a region. Transport is a part of the value chain of most of the industries and businesses and a little innovation in transport creates ripple effects of change across the value stream. As per a study by NITI Aayog[1], it is estimated that, India can save up to 64% of anticipated road-based passenger-mobility related energy demand and up to 37% of carbon emissions in 2030 by pursuing a shared, electric and integrated mobility future. This would result in an annual reduction of 156 Mtoe (Million tonnes of Oil Equivalent) in diesel and petrol consumption for that year, saving Rs 3.9 lakh Crores. Cumulative savings from 2017 to 2030 can be 876 Mtoe for petrol and diesel, worth Rs 22 lakh crore and preventing 1 Giga tonne of carbon-dioxide emissions. Looking at the importance of transport sector and mobility, Govt. of India has decided to organise a summit named 'MOVE: A Global Mobility Summit', to be held on 7-8 September 2018 in New Delhi, in the presence of Hon'ble PM.

In order to achieve a cross cutting and all-encompassing policy for a country like India with diverse cultures, geographies and regions, it is crucial to work separately with each state and UT on their individual strengths, opportunities and challenges. To streamline Strategies of Mobility across the country, NITI Aayog has mandated to each State and UT to formulate State Level Task Force under the chairmanship of the Chief Secretary of their State for seeking valuable inputs and understanding state- specific policy measures with an objective to formulate a Mobility Strategy for each state. NITI Aayog has been working towards evolving a National Strategy for Transforming Mobility, in the spirit of cooperative and competitive federalism, urging all States and Union territories to formulate state- specific comprehensive strategies by constituting respective State Task Forces. Eventually, these strategies will feed in to and form the national level strategy, ensuring inclusiveness not only in the contents but also the drafting procedure of the strategy itself.

The Task Force on Mobility set up by the U.T Administration made efforts to highlight mobility scenario in the state and to formulate Mobility Vision 2030 with this document. One day workshop for four states and two UTs in the Western region viz., Gujarat, Maharashtra, Madhya Pradesh, Rajasthan, Diu & Daman and Dadra Nagar Haveli was held on 31st July 2018 at Gandhinagar. The workshop brought together more than 30 important stakeholders from government, private sector and civil society to collaboratively identify actionable and specific solutions for western region's future mobility system.

Based on deliberations at the regional workshop it was decided to prepare State Mobility Plan 2030. This report draws on the ideas generated at the workshop and serves three primary purposes:

a. Establishing a vision for the future of mobility system
b. Setting up strategies for achieving the vision.
c. Proposing an action plan for implementing Strategies

Assessment of Transport Sector

Sr No.		Daman	Diu	
1	Bus GSRTC	65 trips Vapi –Daman 29 trips Daman- Valsad	Diu to Una Diu to Veraval-Rajkot Diu to Ahmedabad Diu to Daman	45 trips
2	Bus OIDC	6	4	
3	Autorickshaw	181	194	
4	E Rickshaw	20	1	
5	Taxi	100	0	
6	Stage Carriage Permit	26	3	
7	Helicopter Service	Between Daman & Diu	-	
8	Cata-Marine	Proposed between Daman & Diu	-	

Roadways

	Daman	Diu
Area	72 Sq Km	40 Sq km
Population	191,173	52,056
Village	15	4
NH. 848/B	10.17 Km	-
District Panchayat Road	105.00 Km.	20.00 Km
Major District Road	38.98 Km	20.34 Km
Vehicle Population	108000	13070

Development of Roads:

Recently Public Work Department has designed 93.05 Kms of road in Daman to widen the roads with proper design & road furniture for safe & smooth movement in Daman district. The details of project undertaken is as below.

Sr. No.	Road Category	Total Length KM
1.	Coastal Highway/NH 848/B	10.20
2.	Major District Roads (MDR)	39.00
3.	Other District Road (ODR)	19.50
4.	Village Road	14.35
5.	Industrial Road	10.00

2.1.2 Department of Transport (DoT):

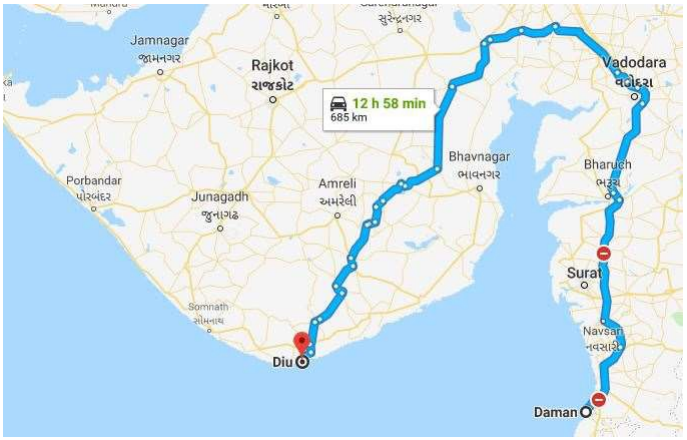
The Transport Department of U.T of Daman & Diu is entrusted with the responsibility of providing an efficient public transportation system, control of vehicular pollution, registration of vehicles in Daman issuance of Driving licences, issuance of various permits, collection of road taxes etc., The department is also entrusted with policy-making, co-ordination, implementation, monitoring and regulatory functions of all the Transport related aspects.

A notable list of innovative initiatives taken up by Transport Department Daman are as follows:

- Simulators are set up at RTO Daman which provides virtual on road environment for training.
- City Bus Services are operational & operated by OIDC & 26 numbers of Private Stage Carriage Buses.
- Automatic Number Plate Recognition (ANPR) that reads the number plate and collects vehicle data will be installed at Integrated Border Checkpost .
- All the auto rickshaws are to be converted CNG base from year 2017
- 20 E Rickshaws are deployed and running on road.
- Road Safety Council has been formed.

Ports

U.T of Daman and Diu being a small coastal region geographically 685 km apart from each other. Marine connectivity has been discovered and Catamaran Service is to Start Shortly between Daman & Diu which will cut journey time to few hours.



Airports

a) U.T Administration of Daman and Diu has started helicopter service between Daman and Diu as part of UDAN Scheme .The chopper service has reduced the 13-hour distance by road between the two Union Territories to an hour by flight

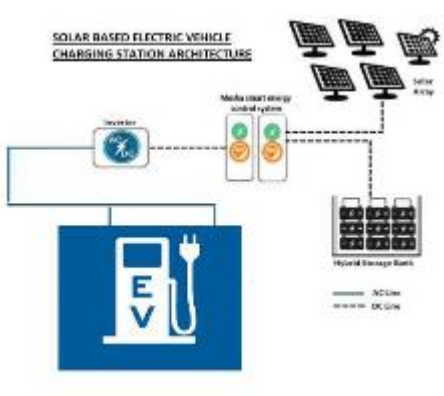
b) Udan : Flight Service between Diu and Ahmedabad.

City Bus Service:

Bus Services in Daman district are operated by Omnibus Infrastructure Development Corporation as Saarthi Bus. The Saarthi bus services are operated on various internal routes in Daman.

Renewable Energy Sources

Electric Vehicles (EV) are the future of transport. With the ever-rising pollution and its detrimental effect on the environment, there has been a large-scale paradigm shift towards EV's. A perennial obstacle faced by most EV manufacturers and consumers is the availability of a plug point for charging when on the go. There definitely is a need to move from the GRID based charging stations to standalone off grid solutions for charging.



Promoting Non-Motorised Transport (NMT) including developing Public Bicycle Sharing (PBS):

Total 20 of E- Rickshaw are running on road at Daman under E – Rickshaw scheme initiated by U.T Administration of Daman & Diu to promote Non-Motorised Transport in the UT with the aim to provide employment and women empowerment.
Daman being a coastal region and a famous tourist destination. Transport Department has proposed E Bicycle on rent scheme at beaches of Daman to encourage clean fuel mobility.

Air Quality Monitoring Station:

A Mobile PUC Testing van is proposed. Free PUC centre at RTO Office for vehicles coming for fitness will be also start shortly. Presently there are two private PUC centres operational in Daman for PUC testing. PUC Certificate is made compulsory for all vehicles and also made mandatory for any vehicles coming for transaction to RTO office.

Parking:

a) Daman being small U.T and a famous tourist destination has limited parking space To overcome parking problem various spots in municipal area has been identified and multi-level parking is being constructed at old Taxi Stand.

b) Bus Stand:

Redevelopment of Existing Bus Stand at Nani Daman into a Modern Bus Terminus with Multi Level Car Parking for auto rickshaw and taxis on PPP Mode.

Safety

a) Police department has increased enforcement on Drunken driving, Minor driving, School vans moving without safety norms, strict use of helmets & restriction on over speeding in Daman & Diu. Also some new equipment's have been purchased for enforcement. i.e E-challan, Breath analyser, movable barricade CCTV Camera's have been installed in Daman.Road Safety Campaign was conducted for entire year. Number of challans for traffic rule violations increased as compared to last year.

b) School buses are directed to install GPS as a Mandatary requirement for registration and Fitness.

Rural Mobility & Farm Logistics

Transport Department has planned to promote E-rickshaw in Four identified rural villages of Daman under Adarsh Gram Yojna.

Mobility Vision 2030 for Daman & Diu

The key element of Mobility is accessibility, i.e. to easily reach one's destination. In order to achieve efficient and sustainable traffic flows, the state must change focus from moving vehicles to moving people and goods. This includes taking into consideration the entire journey from start to finish, which is generally accomplished through a variety of means of transport.

The gap between the current capacity of Transport sectors of the state and the target where state wishes to reach can be bridged by pursuing different strategies and programmes. It is very essential and important to choose alternative strategies for meeting the gap. Selection of a strategy is an extremely important constituent of a Mobility Vision Plan 2030 of the U.T. It is also important to involve stakeholders, which is ensured with the formation of task force. Here it is attempted to form sectoral strategies, as per the discussions and deliberations, considering stakeholders suggestions etc.

Focus Plan:

1) Public Bicycle Sharing.
2) Charging Station for Electric Vehicle.
3) Maximising public Transport GSRTC / OIDC / Taxi.
4) Car Sharing.

State Action Plan for Mobility 2018

Strategy Action	Short Term	Long Term
Shared Mobility	• Promoting ride sharing, vehicle sharing, fixed route commuter services and incentivize the aggregator services app-based taxi booking as Yara Cab will start shortly	
Non- Motorized and Inclusive Transport options	• Develop pavements, walkways and cycle tracks in the urban areas. • Launch e-rickshaws on large scale in all district centers and towns	• Planning and modification of urban infrastructure to make the cities walkable and major destinations approachable on foot or on bicycle. • Promoting Green Urban Transport solutions like development of Non Motorise Transport (NMT), Electric vehicle etc.
Freight Movement	• Subsidize and promote usage of electric and hybrid vehicles for public transportation. • Proposal for E taxis between Daman and DNH. • Green Number Plate	• Scheme for Tax Exemption and 10 years Permit extended on Purchase of Electric Vehicle. • Proposal for E bike at various beaches.

Roads and Infrastructure Development	• Improvement, Widening and raising of major road of the district to meet the increasing vehicle movements. • Alternate mode of transport like cycle track and pedestrian walk has been planned e.g pedestrian walkway from Bus stand parallel to river front to promote alternate transportation. • Cyclothone i.e cycle rally are organized to promote use of cycle in the city and students for environment friendly & health conscious transport.	• Construction of signature bridge connecting Nani Daman and Moti Daman.
Safety and Security and Parking Space	• Daman being small U.T and a famous tourist destination has limited parking space. To overcome parking problem various spots in municipal area have been identified and multi-level parking is constructed at old Taxi Stand and a new Parking Space is proposed at new bus stand for autorickshaws and taxis. • Police Department has carried out road safety awareness campaign for the entire year. Also, challan of enforcement on safe driving has increased during last year. • Transport department also carried out campaign for road safety.	•
	• Police department along with Transport department has issued guideline for school bus and van's plying for carrying students to schools. Strict compliances have been monitored on this guideline. • Mandatory installation of GPS on schools buses is monitored by Transport Department. • Enclosed: some images of camping. • Traffic Island are designed at various cross section at Daman to avoid traffic congestion and provide smooth traffic flow. • Hot spots i.e Accident prone location/ roads are identified in Daman District and road engineering is improved by PWD to provide safe and smooth traffic flow at about 4 no's of locations.	•

Modernization of RTOs and Regulatory methods	• Expansion of the current driving license related services • Develop mobile apps for payment of e-challans and create integrated MIS for all RTO related services – registration, permits, renewals etc .	• Front office automation through outsourcing to external agencies for digitalization – booking an appointment, registration, payment, e-challans.
Use of Coastal and Waterways Infrastructure	• Passenger Ferry Services will be shortly start between Daman and Diu.	
Clean Fuel	• All the auto rickshaws to be CNG based • Proposal for conversion of all Stage Carriage and Contract Carriage Buses to CNG	

Brife Achievements of Transport Department 2018

a. Launch of CNG Taxi.
b. Autorickshaw converted to CNG fuel.
c. Other modes of transport identified.
    i. Air Service
    ii. Sea Service
    iii. Electric Vehicle
    iv. Bicycle track
d. GPS installation made compulsory.
e. Fitting of speed governors in Transport vehicle.
f. Share Taxi service through launch of app (Yara Cab).
g. Integrated Check Post.
h. Road Safety campaign throughout the year (Police / Transport Department).
i. Free Driving training under CSR.
j. Free PUC Camp.
k. Free driving training to students on simulator.

Road Safety Camp by Police Department

Road Safety Week 2018 from 23/04/2018 to 30/04/2018

Sr. No.	Programme	Location
1.	Motor Cycle Rally To promote use of Helmet Introduction of Ultimate Frisbee Game in Daman	Police Head Quarters Daman Moti Daman, Football Ground
2.	Awareness programme for Cyclist. Distribution / Installation of reflector on cycles through industries & Schools	Schools Industries
	Nukkad Nattak by Glonda High School Team.	1. College 2. Polytechnic 3. Nani Daman Bus stand 4. Nani Daman jetty 5. Moti Daman Market
3.	Painting Competition (School and College Students)	Police Head Quarters Daman
4.	Medical Check-up & Fitness Team for drivers, Blood Donation Camp	Police Head Quarters Daman
5.	Felicitation Programme	All 10 Municipal Wards
6.	Daman Ultimate Frizbee Championship Final	Moti Daman, Football Ground

TRAFFIC CHALLANS-ISSUED AND FINES COLLECTED

Sr. No.	Particulars	DNH		Daman		Diu	
		2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
1.	Total Challan Issued	34597	63210	11400	31634	12454	27230
2.	Amount collected	10188070	19328290	1257410	3811055	1461250	2893350

CAMERAS INSTALLED BY POLICE

Sr. No.	Particulars	DNH		Daman		Diu	
		Checkpost	Others	Checkpost	Others	Checkpost	Others
1.	No of Cameras	06	40	22	31	02	06
2.	Camera for traffic	--	20	04	04	--	--

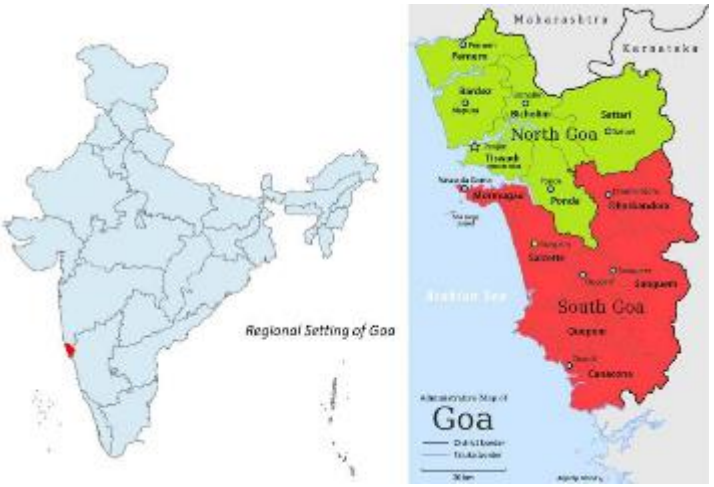
Goa

Introduction of Goa

Goa is the smallest state in India with a population of 14.5 lakhs and 3702 Sq.km geographical area. The increasing urban population in the state requires a new approach to ensure that the sustainability is not only maintained but also enhanced to align with the national objectives.

Goa is along the west coast of India. It is surrounded by Maharashtra in the north and Karnataka in the east and south and with the Arabian

sea to its west. According to census 2011, there are 38 census towns, 1 municipal corporation, 13 municipal councils, 3 urban agglomerations and 11 talukas within the state. The population of Goa is 14.58 Lakhs (as per 2011 Census). The average density of population of the state is 394 persons per sq. km. which is higher than the national average of 382 (as per 2011 census).

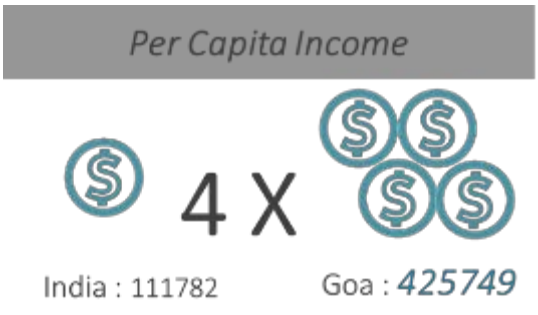


With a developing economy and increasing population, the mobility requirements and patterns within the state are also evolving.

"Transport is unique as only development sector that worsens (in terms of congestion) as incomes rise. While sanitation, health and employment tend to improve through economic development, traffic congestion tends to worsen"

Nevertheless, growth means that the roads, transit systems and infrastructure need to accommodate an increasing number of people, vehicles and goods, in a sustainable manner without any impairment of journey quality. Being a state with both geographical advantages and environmental vulnerability, it is required to promote the development of mobility means, that are most efficient in terms of usage of space, transportation and sustainability.

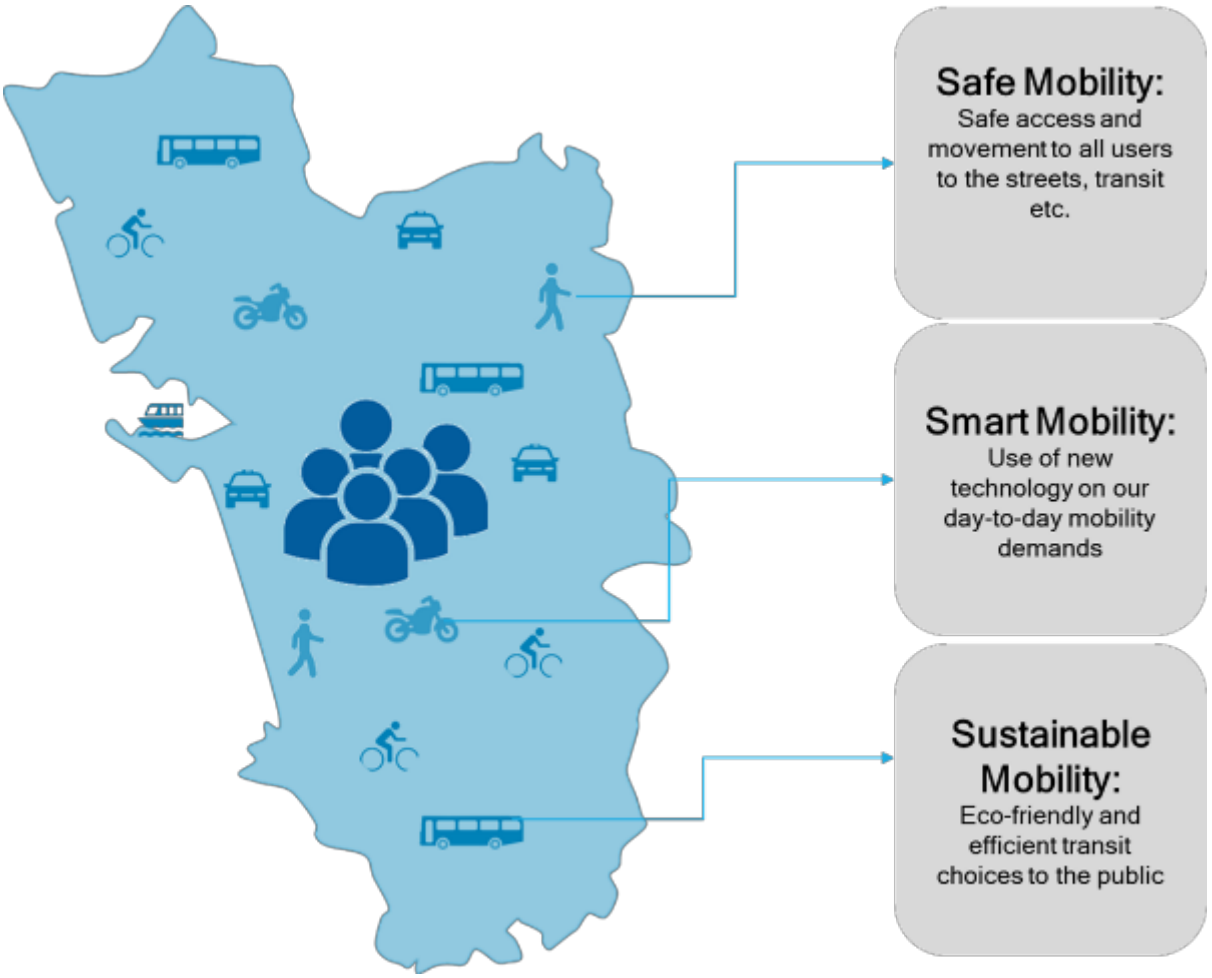
The state of Goa is unique in many ways with 62.17% of its population living in urban areas as per Census 2011. Goa has always remained as a prime tourist destination in the nation, with annual tourist arrivals reaching up to 63 lakhs in 2016. State's economy is primarily dependent upon the tourism and allied activities. The per capita income in the state is four times that of the national average and the Gross Domestic Product (GDP) growth rate much higher than national growth rate at 8.41%.



Vision for Transformative Mobility

The mobility vision strategy for the state of Goa is to be safe, equitable, smart and sustainable.

The strategies are envisioned for improvement of regional mobility and city mobility. Goa State Mobility Strategy provides suggestions on governance and addresses roles & responsibilities and finances.



The primary focus of the mobility plan is to efficiently support the mobility of people and goods rather than vehicles. It aims at three goals specifically - reducing traffic, shifting traffic and managing traffic. Each objective will be applicable to the state mobility as well as for the urban areas. Hence, two levels of strategies - State Level and City Level for sustainable functioning of urban transport systems have been formed.

Situational /SWOT analysis of the existing Mobility Scenario & Transport Systems

Mobility in Goa

The existing mobility pattern is highly dependent on private vehicles with approximately each household owning 3 vehicles. In terms of regional connectivity, Goa is served by air, road, rail and waterways transport.

Air

The airport at Dabolim is the only commercial airport in Goa. Development and construction of green field international airport at Mopa on PPP basis is in progress. New airport at Mopa will provide impetus to tourism industry and could be a catalyst for socio-economic development of the state.

Road

NH 66 (Erstwhile NH-17) runs along India's west coast and links Goa to Mumbai in the north and Kochi to the south.

- NH-66 having a length of 137.55 km
- NH-366 having a length of 17.6 km connecting Vasco Harbour and Goa airport at Dabolim to NH 66 at Cortalim
- NH-566 is a four lane highway connecting airport to NH-66

The NH-748 running across the state for a length of 69.6 km connecting Panaji to Belgaum in east is further connected to Maharashtra, Bengaluru and other cities. Apart from the two main national highways mentioned in the earlier section, there are 8 state highways connecting the regional centers.

Rail

Goa state is served by the Konkan Railways and South Western Railway. There are 2 single broad gauge track routes for the movement of goods and people. These are

- The Panvel-Mangalore North-South link by Konkan Rail Corporation
- The Londa- Mormugao East- West link by South Western Railway
- There are 6 railway stations in the state of Goa, of which Margao, Tivim and Vasco are the major stations.

Waterways

The Tidal riverine system in Goa, comprising the Mandovi and Zuari Rivers, the Cumberjua Canal and the linkage with Mormugao and Panaji ports forms more than 90% of the commercial viable freight inland movement in India. Apart from waterways carrying traffic to and from locations within the hinterland, many major ports are connected to a river or canal system. Thus, inland waterways provides an effective movement for traffic from ports to the hinterland. This turns out to be especially effective for bulk cargo and goods over short and long distances.

Though the state has geographical advantage of well-connected and interlinked inland waterway network, the navigation mechanism using same needs to be fully utilized.

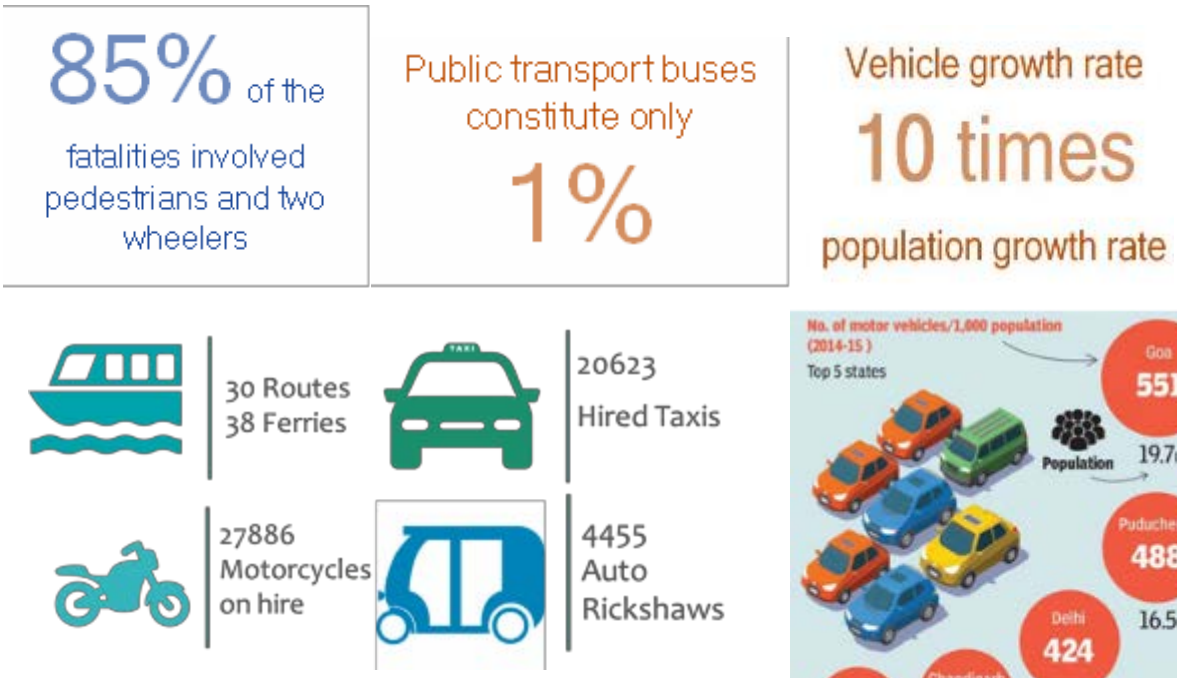
At present, River Navigation Department of Government of Goa is providing the inland water transport services. There are 19 routes and 38 ferries operating in the state on 30 routes.

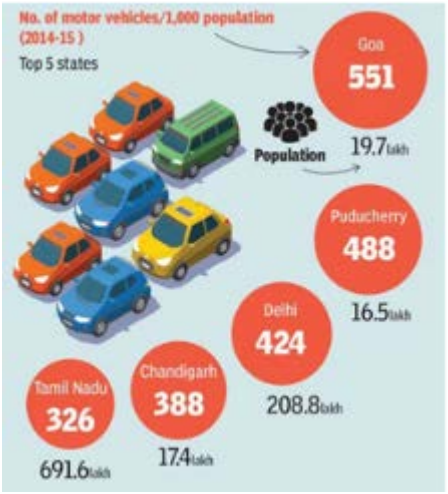
Vehicle Growth Patterns

The vehicle population has grown by 8.22 % over the 10-year period from 2001 to 2011 (RTO). Goa has topped the list of Indian states with the maximum traffic density of 551 vehicles per 1,000 people (2014-15). Interestingly, India's national average vehicle density was 13 per 1,000 citizens in 2014.

Public transportation in Goa is mainly taken care of by Kadamba Transport Corporation (KTC). KTC operates 545 buses interconnecting different places within Goa especially along the Panjim-Margao route. Few of these buses also ply to some of the remote and rurban areas as well.

Thus, the existing mobility in Goa is fragmented with more prominence for private vehicles; Thus increasing the need for more and wider roads, parking and infrastructure facilities. The inadequacy in public transport infrastructure and services in the state, has led to a shift towards choices of private vehicle development and mobility. Only 1% of the total vehicles in Goa are buses, of which 85% is owned by private agencies leading to highly disintegrated and competing services.





This can be contemplated by one key statistics that Goa has highest number of road accidents per lakh population in the entire nation, and twice that of the second highest State.

Mapping of the Travel Patterns

The increase of urban private vehicles leads to many issues related to traffic congestions, road accidents, and air pollutions in city areas is a general conundrum which needs to be addressed in the urban strategy. Public transit is considered to be one of the most effective solutions for these general conundrums. Public transit includes various services that provide mobility to the general public, including buses, trains, ferries, shared taxi, and their variations. The trips at morning or evening rush hours occupy a large proportion of the total trips every day

Presently, there is requirement of integration in the all urban transportation systems at all levels. For example at Vasco railway station, there is requirement of transportation/ traffic information display system at railway station for other modes such as buses, ferries etc. The walking time to bus station is 8-10 minutes, and there is need of smart bus stops with all facilities. The fare system should be regularized and uniform for entire state.

The traffic and traffic signals at all relevant junctions/ intersections is managed by traffic police. Focus of the Comprehensive Mobility Plan (CMP) will be to provide integrated inclusive smart transportation system, smart traffic signals, intelligent transportation systems, and smart parking etc. in Goa. It would take into consideration the existing travel patterns and the travel needs of the citizens of the state.

Analysis and Indicators

The current stage of mobility and accessibility, safety and security will be analysed in the Comprehensive Mobility Plan (CMP). Benchmarking will be performed as per the service level benchmarks for the urban transport by GoI. The indicators will be elaborated for:

- **Public Transport Facilities:** Currently the public transport facilities in Goa are required to be enhanced and made more efficient in terms of quantity, quality, frequencies, coverage etc.
- **Pedestrian Infrastructure Facilities:** State requires more pedestrian facilities along the roads/streets to make city more walkable and likeable. Facilities should encourage pedestrian traffic and discourage private vehicular movements (which will drastically reduce traffic congestion and parking problems)
- **NMT (Non-motories transport) Facilities:** Need to encourage NMVs (Non-motorised vehicles). Formulate strategies and facilities such as cycle tracks, vehicle sharing, and dependency on enhanced public transportation
- **Level of Usage of Intelligent Transport System (ITS) facilities:** Integration of all digital and intelligent transportation mechanism (synchronization of signals, digital integration in traffic management, surveillance, ATS (Automated ticketing system) at stations & bus terminals, tracking and monitoring system for traffic movements & violations etc.) to make smooth and efficient urban mobility system for citizen.
- **Travel speed (Motorized and Mass transit) along major corridors:** Measures for controlling vehicle speeds and restriction mechanism to maintain uniform travel speed.
- **Availability of Parking Spaces:** Provisions of dedicated parking zones (on street & off street), demarcation of no-parking zones, introduction of congestion charges to discourage private vehicles in core/business districts/commercial areas and declaration of the NMV (Non-motorised vehicle) zones.
- **Road Safety:** Road safety measures to avoid accidents and congestions. Development of road geometry and junctions/intersections respectively.
- **Pollution levels:** To control the pollution levels, need to promote pedestrian movement, cycle, sharing vehicles, public transportations. Further there is need to study the pollution levels in collaboration/ association with institutions/ agency for regular quality checks and release of the reports at regular interval of time for state. The Goa State Pollution Control Board (GSPCB) has appointed IIT, Bombay, to conduct source apportionment study to quantify the contributions of emissions from various sources which leads to air pollution in Vasco.
- **Integrated Land Use Transport System:** Transportation system to ensure the areas as per demarcated in ODP (Outline Development Plan), Transportation Policy and Comprehensive Mobility Plan etc.
- **Financial Sustainability of Public Transport by bus:** Financial strategies and functional/ operational models to be develop to make public transportation more efficient and sustainable.

- **Vehicle Utilization of Public Transport:** Ensure the quality, frequencies and affordability for optimum utilization of public transportation by citizens
- **Average waiting time for Public Transport users (min):** Higher the frequency/ number of public transport, lesser the waiting time.
- **Level of Comfort in Public Transport (Crowding):** The quality and comfort is the highest priority for better & efficient public transportation.
- **Interchanges with Multimodal Facility:** Facilities and frequency of interchanges and last mile connectivity plays a significant role in smooth urban mobility.
- **Service Coverage of Public Transport in the State/City:** Regional level coverage and connectivity of public transportation will discourage private vehicle movement in city areas/ business areas.
- **Environmental Concerns:** Control in traffic congestions and large number of vehicle movement in cities area will help in improving urban environment, hence more focus will be on cycle, PBS, pedestrian movement to decrease in carbon emission.
- **Street Furniture:** A liveable city focuses more on pedestrian movement, thus requires amenities & facilities along road/streets like street furniture, public toilets, street lights, green cover for shades etc.

Identifying the Opportunities

- Availability of relevant opportunities by virtue of being tourist destinations i;e. volume of users who can pay.
- Presence of natural or artificial barriers (rivers, lakes, canals, parks, infrastructures, monumental sites, etc.)
- Connectivity to all tourist destinations and urban centers
- Waterways transportation opportunities
- High demand and potential of public transportation system at city, region and state level.
- Compactness of size and a rural- urban seamlessness which should allow Goa to conceptualise a city-state genre of framework.
- Air & sea port transit hub for Maharashtra & Karnataka as no other major port or airport in the region.

Identifying the Challenges & Issues

The SWOT analysis -

• Geographical settings and strategic locations • Huge potential for waterways transportations • High Literacy rate and income level • Legacy of planned infrastructure development from Portuguese times • Prominent tourist destinations • Being small State, easy implementable and manageable • Goa Tourism Development Corporation's (GTDC) taxi app **"Goa Miles"** for Rapid City transfer, airport transportation launched to make smooth mobility.	**Strength**	**Weakness** • Last mile connectivity need to be improved • Narrow road width • For road widening and urban infrastructure need available land space • Influx of more private vehicles causes environmental degradation and increase in pollution levels • Urgent requirement of efficient Pubic Transportation System
• Small Urban areas/cities making it easily accessible by walk/cycle • High tourist population. • Presence of 2 Airport will serve strong connectivity internationally by air. • Mobility will be smooth due to Goa as a City State and compact and self-contained development. • Connectivity to all tourist destinations and urban centers • NH-66 running through the State connecting all major cities/ urban centers • Presence of river in the State makes more Waterways transportation opportunities • River Cross as a huge potential for tourism, transportation etc and will also act as a revenue sources.	**Opportunity**	**Threat** • Increasing numbers of private vehicles • Accident rate • Control on Urban Pollution level • Haphazard parking and encroachments along roads

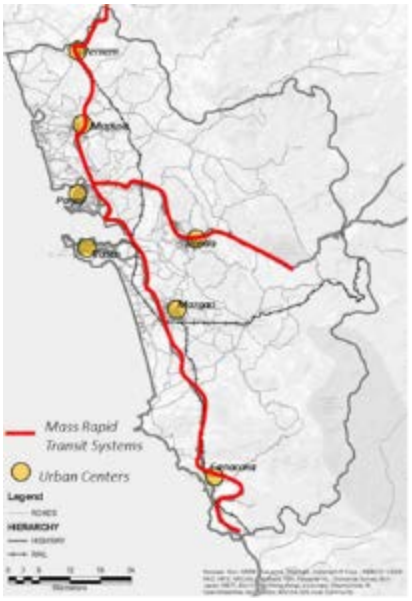
Major Issues and challenges-

- The carriageway capacity within the urban centers needs to be enhanced to cater to ever increasing vehicle numbers.
- There is only a faint coherence between regional network structure and public transport systems.
- Unequal distribution of road space with more emphasis on private vehicle modes.
- The road geometry and design of junctions and road curves needs to be improved.
- Dedicated urban bus services and public transportation is urgent need of state.
- Pedestrian crossing and facilities along with amenities/infrastructure will be essential.
- Encroachment of the valuable road space by on-road parking
- There is need of ITS (Intelligent Transportation System) including digital integration & IT application facilities.
- Signage and road markings required on entire roads and streets.

Mobility Objectives

- Ensure that the urban road structure is organized, suited and aligned with the land use.
- Public transport that is accessible, economical, efficient and effective.
- Sustainable plan that promotes NMT and ensures clean environment and livable towns.
- Traffic management and engineering solutions that increase safety and optimize the efficiency of the network.
- Goods movement that is organized and doesn't interfere with passenger movements
- Parking policies and parking master plans that is sustainable and smart.
- Cost effective and efficient transport mode.

Key Strategic levers for transforming mobility



A two-fold approach is being adopted for the mobility planning of Goa. The strategies will be designed for the state-level mobility development and urban mobility improvement. Hence, strategies are envisioned for improvement of regional mobility and city mobility.

Network Infrastructure for Modes

Rapid Transit Systems

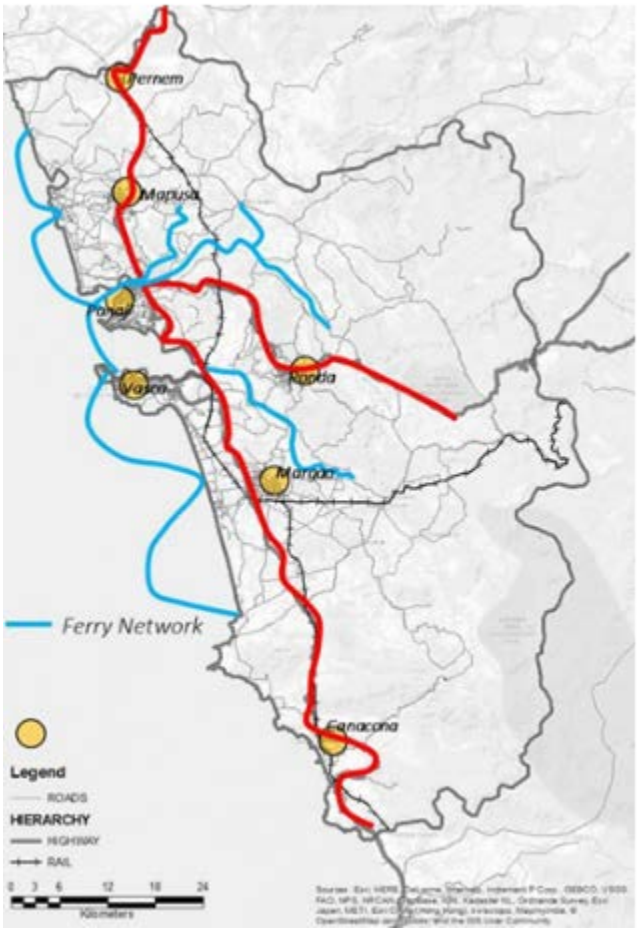
A carefully planned rapid system on high mobility corridors will enhance the connectivity, reduce travel time and cost. It is safer, secure, comfortable and inclusive than the conventional transport systems. The added advantage of a mass rapid transit system is that it increases the importance of the tertiary sectors/ areas leading to the development of new areas. It also opens the door of opportunities to the people living far off from the city.

Mapusa and Panaji in the north to the southern region of Margao, and Vasco have increased by leaps and bounds. Almost daily billions of man-hours are lost with people 'stuck in traffic'. A metro rail system can be another viable option which does not follow the existing road route. Even a multi-modal mass transport system would be a viable option.

Goa requires the mass transit system to connect the urban centers across the state supporting regional mobility. The transit system for the mobility shall be based on the overall transit load along the corridors. The system shall be planned considering the cohesive network in which transit will be accessible for all in Goa.

Water Mobility

Goa is also blessed with suitable waterways. The two prominent rivers, with the adjoining bay and the sea can provide an excellent mass rapid transport system, connecting the cities of Panjim, Vasco and Margao which will be unique in the world. The water ways would enhance the connectivity by integrating it with other modes of transport. The first and last mile connectivity to ferry stations will make the system more effective and efficient. The system can be made more attractive by developing jetties with global standards, bringing electric and hybrid ferries.

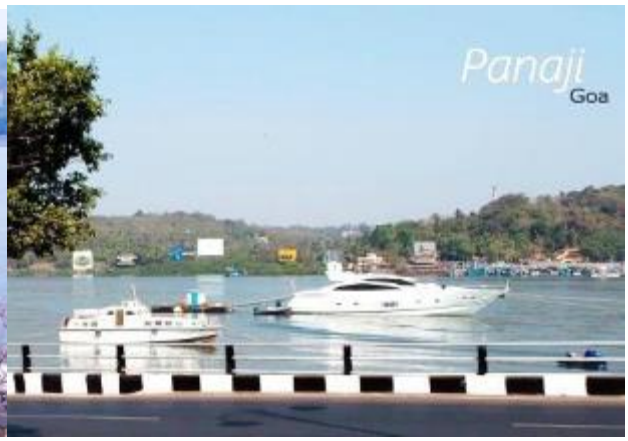


The major advantage of waterways from the point of view of transport is that it offers less resistance to traction at reasonable speeds than other surface modes. The maintenance cost is low as channels are almost natural. Moreover, these waterways channels are often multipurpose ones and hence it is much economical to move goods and passengers.

The Government of India has declared 106 waterways in the country as **National Waterways** with a view to facilitate developing the waterways for shipping and navigation. There is triparty MoU has been signed between Captain of Ports, Government of Goa, Mormugao Port Trust and Inland Waterways Authority of India for development of National Waterways.

Six rivers in the state of Goa have been declared as **National Waterways** as follows-

- **Mandovi River (NW-68)** from bridge at Usgao to the confluence of Mandovi River with Arabian sea at Reis magos (41 km).
- **Zuari River (NW-111)** from Sanvordem bridge to Mormugao port (50 km)
- **Cumbharjua Canal (NW-27)** from the confluence of Cumbharjua and Zuari River near Cortalim ferry terminal to the confluence of Cumbharjua and Mandovi River near Sao Matias Vidhan parishad (17 km).
- **Chapora River (NW-25)** from bridge at State Highway- 124 (1km from maneri village) to the confluence of Chapora River with Arabian Sea at Morjim (33 km).
- **Mapusa River (NW-71)** from the bridge in NH-17 at Mapusa to the confluence point of Mapusa and Mandovi river at Provorim (27 km).
- **Sal River (NW-88)** from Orlim Deusa bridge to the confluence of the Arabian Sea at Mobor (14 km)

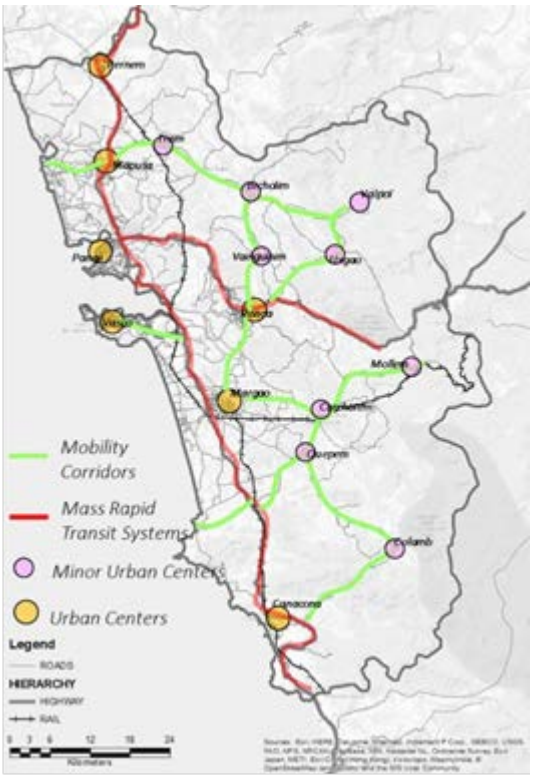


Shared Mobility

Shared-use mobility is defined as transportation services that are shared among users, including public transit; taxis; car sharing, ridesharing (carpooling, vanpooling) etc. Goa being a tourist state, development of shared mobility options is imperative to improve the connectivity.

Shared transportation has grown tremendously in recent years as there is renewed interest in urbanization. Moreover, there the growing environmental, energy, and economic concerns have intensified the need for sustainable alternatives.

Automobile manufacturers, rental car companies, venture- backed startups, and aggregators have sprung up with new solutions ranging from large physical networks to mobile applications designed to alter routes, fill empty seats, and combine fare media with real-time arrival and departure information. The mobility solutions of the state shall encourage the use of shared mobility solutions, envisioning sustainable transport choices to the residents as well as users.



Upgradation of Buses

When transit systems are considered as a single entity, buses are required to reach all the origins and destinations to cover a larger population. A world class bus service system with comfort features of the rapid transit systems is envisaged for Goa. The services shall be reasonably reliable, efficient, convenient, safe and comfortable. The more the bus services meet this description, the better they will serve their existing customer base, and the more they will succeed at attracting new riders and tourists.

The bus services are envisaged at two levels:

- For regional mobility to all the small urban centers and tourist locations within the state: acting as a feeder to the rapid transit systems
- Providing last mile connectivity and transit solutions at all urban centers.

The existing buses shall have to be upgraded with world-class bus fleet and supporting infrastructure like ISBT (Inter State Bus Terminals), which are accessible for all (universal accessibility) creating a new and integrated system for the end users.

Intelligent Transport Solutions and Digitization

Smart Traffic Signals

Traditional traffic signal system only gives instructions to stop and not to vehicle driver. Smart traffic signals are required to increase the security of traffic signal and to reduce human efforts.

Smart traffic signals will assess the traffic real time and guide the vehicle movement appropriately. The system is benefitted to give priority to the transit systems and vulnerable users. Smart traffic signals shall be appropriately suggested in Goa across the urban centers and regional nodes for the safer mobility of all road users.

Benefits of smart signalization are:

- Reduces delay and queuing
- Efficient movement of pedestrians and cyclists
- Maximize the volume movement
- Reduces severity of crashes
- Accessibility to pedestrians and street side traffic

Dynamic Transport Information

Using real time information and communications technologies that improve the safety, efficiency, and performance of the transport system. It can help to reduce congestion, improve mobility, save lives and optimize Goa’s existing infrastructure.

Way Finding and Navigation

Way finding aims at providing widespread, user-friendly information about mobility options and local destinations, delivered through a variety of channels including traditional signage and digital platforms.

First-time visitors and long-time residents alike depend on way finding signage to navigate through the region. The essential function of way finding is to facilitate reaching one's destination by indicating directions and distances. The most effective way finding also provides information on alternative ways of getting to the destination, and highlights additional points of interest along the way. When designed well, way finding can enhance one's surroundings and contribute to a neighborhood's civic pride and unique sense of place, in addition to providing information.

Smart street, parking, and integration of all modes of transportation digitally will help out for navigation and smooth mobility.

Zero Emission Mobility

Countries across the globe are aiming to reduce their dependency on petroleum products and tap into comparatively cheaper form of energy. Policy makers are now looking at electric-mobility as a way to address energy supply issues in the future. Electric mobility/ e-mobility refers to the concept of electricity driven vehicles (commonly known as electric vehicles) and hybrid vehicles, in order to reduce the dependency on fuel driven automobiles, while also addressing carbon emissions.

In 2013, Government of India introduced the National Electric Mobility Mission Plan 2020 to achieve national fuel security by promoting hybrid and electric vehicles in the country. Government aims to provide fiscal and monetary incentives to kick start this technology. Government of Goa shall appropriately frame policies and strategies for the development of environmental friendly modes to be used.

Inland Waterways Authority of India, GoI, declared 106 National Waterways in India and out of which 6 National Waterways declared in Goa. This inland waterways transportation services need to be enhanced to global standards.

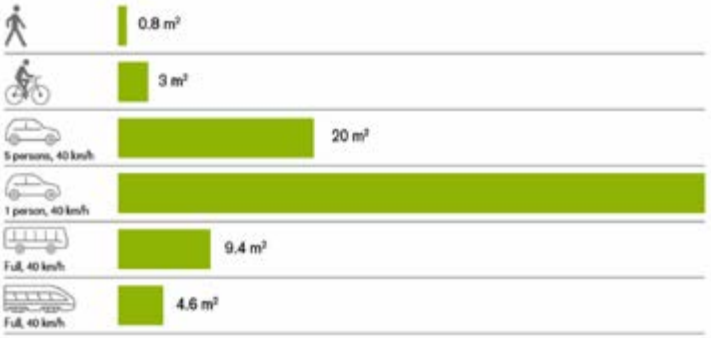
Renewable Energy Sources

This strategy shall focus on renewable energy in urban transport system like solar panel on street lights, bus stops etc. in more efficient way.

Non-Motorized Transport/Pedestrian Facilities

Complete Streets

This strategy is aimed at implementing a balanced transportation system on all streets in Goa, using complete street principles to ensure the safety and mobility of all users. A transportation system that accommodates the needs and considers the safety of all users is at the foundation of mobility. An effective transportation system allows for the use of multiple modes and in the end results in providing a variety of options for people to move around in ways that best suit them.



Developing complete streets in Goa will be based on the concept of equitable distribution of land spaces. The illustration above indicates the area occupied by each vehicle/mode along with the speed and number of people carried. The concept of complete streets will be based on the same, in which the least area occupying mode, pedestrians would be given priority and more road spaces appropriately.

The state level strategy for complete streets will discuss different categories of roads/streets for regional mobility and design guidelines for its development. This will also be dependent on the population density, urban characteristics and mobility pattern of the region.

Cycling Infrastructure

Cycling is increasingly recognized as a clean, sustainable mode of transport and an essential part of an inter-modal plan for sustainable urban travel. More cycling in urban areas in place of car use could contribute to less energy consumption from travel activity and reduced congestion. Increasing cycling could be a promising way to contribute to the reduction of greenhouse and other emissions. More than capturing the captive users to use the cycles for movement, the development of cycle tracks should attract more uninterested citizens/tourists to use cycles.

Bicycle friendly streets are the roads which are safe for bicycle users, considering features like safety, connectivity, comfort and ambience. The cycling infrastructure for connecting tourist destinations and creating cyclable urban core shall be designed.

Streets for All

Facilitate regular “open street” events and repurposing of the public right of way. In a city where public gathering spaces are few, creative solutions have to be employed. The flexible nature of complete streets can allow an underutilized space to be converted to other uses fitting to the situation.

Short-term repurposing of streets for non-vehicular purposes can be a highly effective means of encouraging people to get outside, promoting both physical activity and social connections.

Shared Cycling Facilities

A bicycle-sharing system, public bicycle system (PBS), or bike share scheme, is a service in which bicycles are made available for shared use to individuals on a very short term basis. Bicycle docking station is where the individuals can safely park their own cycles.

The primary goal of implementing bike sharing facilities is to increase the use of cycle in the state, making it a convenient and easy option for the short distance travel. This in turn will benefit the cities in Goa in many ways like reducing congestion, increasing the accessibility, increasing the outreach of transit systems etc.

Inclusive Mobility

All the proposals mentioned above will be inclusive and equitable for all users. Also, a special concern will be on mobility for women, elderly, children and physically disabled/ challenged. The participation of disabled residents in testing and improving road facilities is an important measure to ensure inclusive mobility and shall be adopted across the state.

Transport Oriented Planning

Transit Oriented Development

Transit Oriented Development (TOD) integrates land use and transport planning and aims to develop planned sustainable urban growth centers, having walkable and livable communes with high density mixed land-use. Citizens have access to open green and public spaces and at the same time transit facilities are efficiently utilized.

TOD increases the accessibility of the transit stations by creating pedestrian and Non-Motorized Transport (NMT) friendly infrastructure that benefits large number of people, thereby increasing the ridership of the transit facility and improving the economic and financial viability of the system. Since the transit corridor has mixed land-use, where the transit stations are either origin (housing) or

destination (work), the corridor experiencing peak hour traffic in both directions would optimize the use of the transit system.

Freight Movement

Safe Regional Goods Movement

Goods movement is a regional issue. Goods movement shall be planned considering the economics of the movement for the transporters and the safety of the other road users. State of the art corridors for cargo movement along with truck terminals will separate the passenger traffic with goods alleviating congestion, improving mobility, traffic safety and promote economic health.

The freight corridors shall be planned considering the geography of the place with truck terminals at major points considering both urban freight and regional freight. The truck terminals with intelligent transport facilities will organize the freight in such a manner that it is most economical. Innovations in the vehicles technology will improve the effectiveness of the system.

Traffic Management for Goods

Traffic management for goods will identify and prioritize the corridors for the cargo entry in the urban centers, their timings, restrictions, loading and unloading areas etc. Truck movement shall be limited to the arterial street network as much as possible since these streets have the lanes and wider turning radii to accommodate these heavy large vehicles. Land uses along heavily used truck routes shall coincide with goods movement priorities and limit interaction with residential uses.

Safety

Design for Vulnerable Users

Our streets need to be safe for all users. By planning and designing for the most vulnerable users, we ensure our streets will be safe for all. Roadways should operate in a manner that considers the presence of people who walk and bike, children, the elderly, and the mobility-impaired. In many cases, roadways are designed to facilitate vehicle throughput first, rather than other modes. The design and operation of our streets to create a safe and livable environment for people is a priority for our city. Providing more attractive and wider sidewalks, and adding pedestrian signalization, street trees, and other design features encourages people to take trips on foot instead of car. Secondly, considering cycling tracks for the road design also create the need for use of the system.

Safe Junction Designs

It is noticed that traffic accident rates are usually higher at intersections. Many factors affect accident occurrence at intersections, include traffic volume, traffic control, and frequency of access points, the number of arms, the speed limit, the median type and width, the number of traffic lanes, the existing turn lanes and the lighting level. Junction improvement essentially involves the combination of the following elements:

- Closure of medians at certain intersections
- Prohibition of free right turns
- Provision of adequate sight distance
- Providing adequate corner radii
- Providing sufficient turning radii
- Flaring approaches towards intersections

- Providing channelizes/division islands
- Providing pedestrian and cyclist crossing facilities

Traffic Movement Plan

Road based transport is the predominant mode of transport and it has mixed traffic of private vehicles and public transport. Bad road engineering and unregulated traffic decreases the safety on roads. Safe traffic movement plan in the state would improve the overall travel experience and decrease accidents. This would include the identification of accident black spots, redesigning of junctions and carriageway features to incorporate safety measures and traffic calming measures. These would streamline the traffic movements in regulated way and reduce collisions.

Safety management plan is a coordinated multi-disciplinary partnership process which strives to achieve safety goals by ensuring that all opportunities to improve road safety are identified, considered, implemented and evaluated in all phases of planning, design, maintenance and operations. Smart traffic management measures would enable drivers to adopt to more environmentally friendly driving habits that reduce fuel consumption, emissions and reduce stress and micro accidents.

Mobility Financing and Entrepreneurship

The financing of urban transport projects in the country has largely been confined to gross budgetary support from the government and the user charges. Due to heavy investment needs of urban transport and conflicting demands on the exchequer, the investment in urban transport in past has not kept pace with the rapidly increasing requirement of the sector.

They can be broadly grouped into three groups depending upon the extent of direct use benefit and to which they contribute to the project:

- **Direct-use beneficiaries:** Direct user beneficiaries include commuters who will use the transport services, businesses using benefit from the assets created, and advertisers who may be able to generate revenue by utilising the space on rolling stock, stations, bus stops etc.
- **Proximity beneficiaries:** Proximity beneficiaries are those businesses along or close to the corridor along which the public transportation system will operate. They benefit from increase in customer flow and business activity. Value of land and property owned by residents in these areas will also appreciate due to the better transportation linkages
- **Indirect beneficiaries:** Indirect beneficiaries include all other road users who experience less congestion on the roads due to other users using the public transport. Indirect benefits also include congestion pricing, green cess, improvement in air quality, availability of more public space, and reduction in use of fossil fuels and the concomitant impact on environment

The current level of user charges of limited urban transport facilities, do not make the system self-sustainable. At the same time, providing safe, comfortable, speedy and affordable public urban transport to all has to be a necessary goal of the governance. The key funding sources besides government budgetary support and fare box can be dedicated levies, land monetization, recovery from indirect beneficiary, debt and private investments. The paradigm of financing has to clearly move towards non-users pay principle and the polluters pay principle. There is a need for long-term sustainable dedicating financing mechanism to address fast worsening scenario in the field of urban transport.

There are a lot of variables that should be closely considered for effectively capturing value from other types of benefits.

- Fare-box revenues
- Advertising revenue

- License fee from business activities
- Congestion pricing/fee
- Real estate development rights
- Betterment levy
- Higher Floor Space Index (FSI)
- Carbon credits/ Green cess

Rural Mobility and Farm Logistics

Intermediate means of transportation are important for on-farm, within-village and village-to-market transport and short urban and peri-urban movements. With higher transport demand, larger motorised vehicles are justified, particularly on the rural-urban linkages. Low use of intermediate means of transport in remote areas is often associated with weak supply systems, weak support services and lack of entrepreneurial service providers. Markets in neighboring regions can be accessed and diversified.

There is need of understanding all stakeholders/ organisations involved in rural transport planning, regulation and implementation and to strengthen the capacity accordingly. More attention will be on targets for each transport sub-sector and assessment of mobility needs.

As per Census 2011, 62.17% of the total population of Goa lives in the urban areas and the rest of the region in the state being a rurban/rural region. The major emphasis shall be on strengthening the core transit corridors and providing last mile connectivity. This shall automatically enhance the mobility and transportation system of rurban/ rural regions of the State.

R&D and Advanced Manufacturing

Research and development initiative will focus more along with research based institutions, organisations and think tanks such as IIT- Goa, NIT-Goa, Goa Engineering College (GEC), Goa University, National Institute of Oceanography (NIO), Goa Medical College (GMC), the Goa Institute of Management (GIM) and other institutions. R&D is likely to be located primarily in large urban regions.

Goan Information Technology professionals and IT people collaborating with the state department of Information Technology are holding a hackathon to create a directory of all information technology companies within the state. This hackathon is completely crowdsourced, creating a digital directory of all the startups in the state. The main aim is to get the directory out to the public use. This is a new approach to the system, letting the public get this information through a hackathon over waiting for the Government to complete the database. The Government released the ‘Goa Investment Policy’ and announced that they needed a registry to gather all the names of the companies in Goa. The information mentioned in the database is supposed to promote Goa as a hub for information technology and incubation.

The corresponding success of regions which hope to become major areas of spin-off and creativity is likewise constrained by the joint preferences of R&D institutions, workers, venture capital, investors, and high-tech employers.

There is large scope for research and development destination in Goa and can increase its market share in the R&D segment.

Employment & Skilling

The skill shortage requires government intervention. Across the different transport modes, the skilled labour issue plays out in different ways. In aviation, entry to the profession is highly regulated and based on licensing. Semi-skilled or minimally educated workers constitute a large portion of

employment. As the business environment transforms into a more mature arena, a strong demand and concern are quality and efficiency. It does away core issues around enabling infrastructure, regulations and consolidation, a fragmented industry, can be tamed gradually.

Cyber/Data Security & Safety Mechanisms

The urban infrastructure provides facilities to the citizens, which can only be converted in to smart solutions through the use of digital technology. Digital technology acts as a force multiplier that multiplies the impact of the underlying infrastructure by many folds. The Smart City SPV, Imagine Panaji Smart City Development Limited has already taken initiative to set up a Goa Intelligent City Management System, wherein a separate Network and Operation Centre (NOC) & Security Operation Centre (SOC), is being provided to cover the services of the entire state, with transport sector having a major impetus.

The smart solutions that are being envisaged would be integrated at the Command and Control Centre with a Network and Operation Centre (NOC), Security Operation Centre (SOC), LED walls for Surveillance and software which would provide and disseminate information to various stake holders.

The Smart City SPV, Imagine Panaji Smart City Development Limited has also conceptualized the idea of a 'Goa Universal Smart Card System' that shall provide free open loop based cards to the citizens with a 'zero MDR (Merchant Discount Rate)'. These cards can be utilized for multiple purposes including public transport, smart parking etc. and shall provide a safe and secure means of cashless transaction to the citizens. Further, the universal card shall work with Big Data Analytics to ensure information about consumer preferences such as travel to work destinations, specific time zones of usage of public transport etc. can be mapped with the usage of the city card.

State Action Plan

Interventions	Key Action Areas	Implementing Agencies	Deadline
Mass Rapid Transit system	Rapid Transportation to connect Panjim with major other destination areas (*proposed International Airport at Mopa, and urban nodes in North and south Goa*).	Director of Transportation	-
Water Transport/ Inland Waterways	Jetty and ferry precinct development, Amenities and facilities at Jetty and ferry precinct	Captain of Ports	-
Multi Modal Integration	Development of multi model integration like BRTS (*Bus Rapid transit system*), Last mile connectivity, MRTS (*Mass Rapid transit system*)	IPSCDL for Panaji Urban Agglomeration / Director of Transportation	-
Transit Oriented Development (TOD)	Integrates land use and transport planning and aims to develop planned sustainable urban growth centers.	KTC / DoT/ IPSCDL for Panaji Urban	-
Interventions	**Key Action Areas**	**Implementing Agencies**	**Deadline**
	TOD increases the accessibility of the transit stations by creating pedestrian and Non-Motorized Transport (NMT) friendly infrastructure	Agglomeration	
Public Bike Sharing/ Cycling Infrastructure	bicycle lanes, Cycle Dock/ Stations will be adjacent to the mass transit stations, bus stations, railway stations, tourist locations etc. to increase the reach of transit facilities	Goa Tourism/ IPSCDL for Panaji Urban Agglomeration	-
Smart Traffic Signals	across the urban centers and regional nodes for the safer mobility of all road users	IPSCDL for Panaji Urban Agglomeration	-
Parking infrastructure and Management	On-Street Parking Off-Street Parking	ULBs/ DoT/ GTDC	-

Proposed Implementing Agency- This may vary as per Government of Goa

Proposed Institutional and Regulatory Reforms

In the planning and execution of projects, public institutions increasingly look for co-operation with other stakeholders, such as enterprises, citizens and interest groups. Institutional strengthening and integration in the urban transport sector in Goa shall only result in the effective implementation, operations and management of the solutions.

The Smart City SPV, Imagine Panaji Smart City Development Limited has taken a proactive step in formulating the Comprehensive Mobility Plan (CMP) for the State of Goa.

Institutional framework for the successful implementation of all urban projects will be suggested as part of the CMP based on which a Unified Metropolitan Transport Authority (UMTA) shall be established in the state for effective development of land use and the transport system of the state.

Some of the regulatory reforms that shall be formulated at the state level (aligned with Transportation Act) include but not limited to:

- Regulatory reforms that enable fleet-based operations in order to encourage private players in the field of sustainable mobility
- Regulatory reforms to control emissions caused by vehicles
- Regulatory reforms to minimize the influx of private/tourist vehicles in cities and to promote public transport as the major means of commute.
- Regulatory reforms and building by-laws

Conclusion

With the city and the districts being faced with new challenges, new approaches are needed in administration. Societal tasks and problems become ever more complex, the interests of different stakeholders are more diverse than ever. To master the challenges new forms of co-operation and steering in the administrative context as well as with the stakeholders outside the public administration are sought.

The Comprehensive Mobility Plan is a visionary document for the mobility development in the state, which requires a collective effort and long term integrated planning vision for its success.

Any other relevant information

The strategy will also comply and align convergence agenda with various schemes and various agencies of Government of India synergizing various stakeholders interiliac as follows-

- Smart City Mission
- AMRUT Mission (Atal Mission for rejuvenation and urban transformation)
- Green Highway Mission
- Inland Waterways
- Airport Authority of India
- Konkan Railway
- South Western railway etc.

IPSCDL (Imagine Panaji Smart City Development Limited) is also implementing various smart city projects with the interventions in urban areas and development for urban transportation system. The projects are as follows-

- Smart Street
- Command and Control Center
- Goa Universal Smart City Card for all G2C (Multi-Purpose government to Customer), and

including integration with all transportation mode

- PBS (Public Bike Sharing)
- Road side smart bus stops, street lights, digital signage, CCTV surveillance & Camera etc.

Gujarat

Introduction

Transport is an important factor in the context of sustainable development due to the pressure it places on the environment, its economic and social impacts and its linkages with other sectors. Transport innovations most profoundly influence the pace and growth of economic development of a country or a region. Transport is a part of the value chain of most of the industries and businesses and a little innovation in transport creates rippling effects of change across the value stream. As per a study by NITI Aayog[3], it is estimated that, India can save up to 64% of anticipated road-based passenger-mobility related energy demand and up to 37% of carbon emissions in 2030 by pursuing a shared, electric and integrated mobility future. This would result in an annual reduction of 156 Mtoe (Million tonnes of Oil Equivalent) in diesel and petrol consumption for that year, saving Rs 3.9 lakh crore (at USD 52/bbl of crude). Cumulative savings from 2017 to 2030 can be 876 Mtoe for petrol and diesel, worth Rs 22 lakh crore and preventing 1 Gigatonne of carbon-dioxide emissions. Looking at the importance of transport sector and mobility, Govt. of India has decided to organise a summit named **'MOVE: A Global Mobility Summit'**, to be held on 7-8 September 2018 in New Delhi, in the presence of Hon'ble PM.

In order to achieve a cross cutting and all-encompassing policy for a country like India with diverse cultures, geographies and regions, it is crucial to work separately with each state and UT on their individual strengths, opportunities and challenges. To streamline Strategies of Mobility across the country, NITI Aayog has mandated to each State and UT to formulate State Level Task Force under the chairmanship of the Chief Secretary of their State for seeking valuable inputs and understanding state-specific policy measures with an objective to formulate a Mobility Strategy for each state. NITI Aayog has been working towards evolving a National Strategy for Transforming Mobility, in the spirit of cooperative and competitive federalism, urging all States and Union territories to formulate state-specific comprehensive strategies by constituting respective State Task Forces. Eventually, these strategies will feed in to and inform the national level strategy, ensuring inclusiveness not only in the contents but also the drafting procedure of the strategy itself.

The Task Force on Mobility set up by the Govt. of Gujarat made efforts to highlight mobility scenario in the state and to formulate Mobility Vision 2030 with this document. On 31st July 2018, Govt. of Gujarat convened a one day workshop for four states and two UTs in the Western region viz., Gujarat, Maharashtra, Madhya Pradesh, Rajasthan, Diu & Daman and Dadara Nagar Haveli at Gandhinagar. The workshop brought together more than 30 important stakeholders from government, private sector and civil society to collaboratively identify actionable and specific solutions for western region's future mobility system.

Based on deliberations at the regional workshop it was decided to prepare Gujarat State Mobility Plan 2030. This report draws on the ideas generated at the workshop and serves three primary purposes:

a. Establishing a vision for the future of Gujarat's mobility system
b. Setting up strategies for achieving the vision.
c. Proposing an action plan for implementing Strategies

[3] India Leaps Ahead : Transformative Mobility Solution for All by NITI Aayog, May 2017

Assessment of Transport Sector

Situated on the western coast of India, Gujarat is one of the most progressive and developed state of the country. The state of Gujarat accounts for 6% of total geographical area of India and 5% of the total population. As per census 2011, population of Gujarat State is 6.038 crore (60.38 million), out of which 2.571 crore (25.71 million) people are living in urban areas. This shows about 43% of Gujarat's population resides in cities and towns, indicating that the state's present urbanization level is much higher than the national average of 31.16%.Over the past decade, Gujarat's Gross State Domestic Product (GSDP) increased at a robust rate. Overall growth of the economy is attributed to robust performance of both agriculture and manufacturing sector, reporting a decadal output growth of about 10%. The per capita income of the State[4] is almost 1.5 times higher than the national average. Gujarat has consistently ranked among the top 5 states in India on many social, economic and developmental parameters. Transport Sector-wise Analysis is made as under:

Roadways

The state of Gujarat has one of the most extensive and traffic intensive road network in the country. The total road length in Gujarat currently stands at about 77,500 kms (Table 1). This can broadly be divided into a core and a non-core network. The core network comprises of the National Highways and State Highways, while the balance constitutes the Non-core State Highways, Major District Roads, Other District Roads and Village Roads.

Table 1

Type of roads in Gujarat	Length (kms)
National highways	5,456
State highways	19,761
Major district road	20,641
Other district roads	10,493
Village roads	21,110
Total	**77,461**

Source: State R & B. 2017

Development of Roads:

The state government launched an ambitious 6000 km State Highway Development Program (SHDP) to address the core network's need for up-gradation and maintenance. Arterial network to augment road connectivity of Dedicated Freight Corridor (DFC) and Delhi Mumbai Industrial Corridor (DMIC) areas with Ports and other growth centres has been identified. The national highway network of Gujarat has benefited from the Golden Quadrilateral and North South East West axis of the National Highway Development Program passing through the State. Part of which Ahmedabad Vadodara Express way of 93 KMs is developed.

The State has implemented several network improvement initiatives such as the World Bank funded roads, Pragati Path, Kisan Path and Vikas Path road development programs. Such programs have led to substantial improvement of several key stretches of State Highways, offering fairly sound ridership experiences.

[4] Socio- Economic Review 2017

Gujarat State Road Transport Corporation (GSRTC):

GSRTC was established on 1 May 1960 with formation of Gujarat state. From a beginning of 7 divisions, 76 depots and 7 divisional workshops; it has gone to 16 divisions, 126 depots, 226 bus stations, 1,554 pick-up stands and 9,000 buses, average 6600 schedules of buses with more than 50000 workforces. It covers about 99% of State area. Averages of about 6700 buses are moved on roads with an average of 425 km/day with fuel efficiency of 5.53 l/km.

Monitoring systems like GPS, OPRS, IDMS, CCTV CAMERA, ETM, ERP, DAS etc. have been implemented at GSRTC. More than 30 members team are monitoring and working under CCC. GSRTC is also under process to establish CC at all 16 divisions. Recently, as part of route rationalisation, GSRTC has identified 277 trips and modifications were made in the routes to remove parallel operation.

GSRTC has also Fuel Automation system in place. Live GPS application and API are integrated with CM dashboard. GSRTC has also planned to start electric buses.

GSRTC has successfully developed the World class, high quality bus terminals on PPP at Ahmedabad, Vadodara and Mehsana. GSRTC is also developing nine bus terminals under PPP model at Rajkot, Palanpur, Amreli, Modasa, Nadiad, Bhuj, Patan, Bharuch, Navsari. It has also planned to develop new Bus Terminals at Junagadh, Jamnagar, Bhavnagar and Surendranagar. A state of art Multi Model Transport hub is going to develop Integrated Multi Model Transport Hub (MMTH) at Lambe Hanuman, Surat.

Gujarat Commissioner of Transport (CoT):

The Transport Department of Govt. of Gujarat is entrusted with the responsibility of providing an efficient public transportation system, control of vehicular pollution, registration of vehicles in Gujarat, issuance of Driving licences, issuance of various permits, collection of road taxes etc., The department also entrusted in policy-making, co-ordination, implementation, monitoring and regulatory functions of all the Transport related aspects of Gujarat.

A notable list of innovative initiatives taken up by CoT Gujarat are as follows:

- Institute of Driving Training & Research (IDTR) are setup in each district
- Automated Driving Test Track (ADTT) being used for driving tests since 2012
- Process of converting existing ADTT to Video Analytics
- State of the art Vehicle Inspection and Certification (I&C) centre at Surat to issue Fitness certificate.
- Janvahini for simplification in approval process of City Bus Services
- Improved and inclusive policies for Zero emission vehicles (ZEV)
- Efficient Enforcement mechanism at check post using Automatic Number Plate Recognition (ANPR) that reads the number plate and collects vehicle data
- Automatic Vehicle Measurement System (AVMS) creates 3D image of the vehicles and vehicle dimensions are measured.
- Gujarat is the first state to adopt CNG act – Only CNG auto rickshaws have been registered with regional transport authorities post Apr, 2005
- Gujarat Government now working on E-Rickshaw project for curbing pollution
- Enactment of Gujarat Road Safety Authority Act -2018

Railways

As a crucial infrastructure, railways have an important responsibility to participate in providing linkages to the upcoming centres of growth. The span of railway network lines in the state of Gujarat are mentioned in Table 2.

Table 2

	Total Network Length	Broad Gauge Single Line	Broad Gauge Double Line	Meter Gauge	Narrow Gauge
Length	5314	2548	687	1558	521
% of Total	100%	47.90%	12.90%	29.30%	9.90%

Source: Western Railways, 2017

In view of the rapid growth in the industrial and port sector, the State Government is looking for strategic options to improve transport facilities. This includes conversion of existing railway lines from narrow/metre gauge to broad gauge, establishment of new railway lines to connect the industrial growth centres, logistic hubs and ports. More than 45% rail network is converted in broad gauge in the state. Some of the key initiatives by Railways in the state of Gujarat are mentioned below:

G-RIDE:

As per Joint Venture Agreement signed on 17th August 2016 between Ministry of Railways (MOR), Government of India and Government of Gujarat (GOG), a Special Purpose Vehicle (SPV) namely Gujarat Rail Infrastructure Development Corporation Limited (G-RIDE) has been incorporated for the purpose of development of viable railway projects in the state. It has objectives to carry on the business of development, financing, planning, operations and management, implementation of viable projects which may require VGF that are important for critical connectivity/capacity enhancement, development of other infrastructure facilities, by undertaking surveys, preparation of Detailed Project Report (DPR), sanctioning of further railway projects as identified by the Company or by the private parties, to act as technical consultants and advisors in all related matters. It will also help the WR to have Gauge Conversion of about 200 kms in the State.

Re-Development of Surat Railway Station as a Multi Modal Hub*:*

Indian Railways Station Development Corporation (IRSDC), Gujarat State Road Transport Corporation (GSRTC) and Surat Municipal Corporation (SMC) intends to develop a Multi Modal Transport Hub (MMTH) comprising of Surat Railway Station, GSRTC Bus Depot and SMC land in Surat (Gujarat) on PPP mode. The MMTH shall integrate all public transport modes such as City Bus, Bus Rapid Transit System (BRTS), State regional bus service, Metro Rail, Railways and intermediate public transport modes such as auto rickshaw and taxis. IRSDC, GSRTC & SMC is forming project Specific Joint Venture Company (JVC)/SPV for development of international standard multi-modal interchange facility. MoU is entered on 17th August 2016 by all the three parties with equity sharing IRSDCL (63%), GSRTC (34%) and SMC (3%).

Gandhinagar Railway Station Re-development:

Ministry of Railways has selected Gandhinagar (the State Capital) Railway Station for its redevelopment by exploitation of Railway Station Airspace for development of Hotel in integration of Mahatma Mandir and Helipad Ground owned by the Govt. of Gujarat. This hotel aligns to the central vista of Gandhinagar, thus adding to the aesthetics of the Central axis and complementing Dandi Kutir and Mahatma Mandir facilities. An SPV named Gandhinagar Railway & Urban Development Corporation Ltd (GARUD) has been formed with Equity Contribution of Government of Gujarat (74%) and IRSDCL (26%) to work as a Joint Project Development Company for Gandhinagar Railway Station, development of hotel on the airspace above Railway Station and management of Mahatma Mandir and Exhibition Centre at Helipad Ground.

Delhi Mumbai Industrial Corridor (DMIC):

In view of the rapid growth, Government of India plans to develop a multi-modal high axle load Dedicated Freight Corridor (DFC) between Delhi & Mumbai covering an overall length of 1483 km. GOI further proposes to establish a “Delhi Mumbai Industrial Corridor” (DMIC) along the alignment of DFC between Delhi and Mumbai. The objective of DMIC is to promote the economic development of the region through the creation of a long term enabling environment. The project influence area for

DMIC extending up to 150 KMs on both sides of the DFC alignment presents an enormous opportunity for Gujarat.

Some of the positive features that could prove to beneficial for Gujarat are:

- 553 kms (36.89%) of the DFC passes through Gujarat.
- 4 out of 9 junctions planned as interchange stations with the existing rail network are in Gujarat.
- Industries in Gujarat can access the DFC at several locations along the corridor.
- Nearly 60% of the containerised cargo originates in the North West hinterland.
- More than 70% of the traffic on the DFC is expected to be feeder traffic. Industries and ports can leverage on this opportunity for feeder traffic.
- The project influence area (DMIC) covers nearly 62% of the area of the State, providing an opportunity for creating an economic area that provides a globally competitive environment for manufacturing and services industries.

Ports

Gujarat has India's longest coastline of 1600 km and is the nearest maritime outlet to Middle East, Africa and Europe. The State acts a natural gateway to the rich land-locked northern and central hinterland. The state ranks first in cargo throughput amongst all Indian ports. There are 49 ports which include 1 major port and 48 non-major ports geographically dispersed across south Gujarat, Saurashtra and Kutch region. Gulf of Cambay and Gulf of Kutch provides natural navigational safety and logistical advantage to northern and central parts of India. At present, Gujarat has become the maritime gateway of India and currently accounting for more than 40% of the nation's maritime traffic.

The State Government has set up Gujarat Maritime Board (GMB) - the first autonomous Board in 1982 to develop, administer and regulate the Gujarat non-major ports. Year on year, Govt has been taking initiatives to take the maritime sector of the state to the pinnacles of excellence. Govt. of Gujarat and GMB has signed concession agreements with Pipavav, Mundra, Dahej, Petronet LNG Ltd, GCPTCL and Hazira.

Gujarat Ports have been at the forefront of port sector development in the country in terms of policy, planning and implementation. The State's port policy announced in 1995 envisaged 10 new sites along the Gujarat coastline for development. BOOT policy for the Port sector was stipulated in 1997 which resulted in first private sector port development in the country.

Airports

Gujarat possesses one of the largest networks of airports and airfields in the country. There are 17 airports including one international airport and one green-filed airport being constructed at Dholera. Of these airports, nine (in Ahmedabad, Vadodara, Bhavnagar, Rajkot, Deesa, Surat, Kandla, Porbandar, and Keshod) are managed by the Airports Authority of India (AAI), three (Bhuj, Nalia and Jamnagar) by the India Air Force (IAF), three (Mehsana, Amreli, and Mandvi) by the Gujarat State government and two (Mithapur (Tata) and Mundra (Adani)) by private companies. In addition, state envisages opportunities in non-passenger segment viz. Maintenance, Repair and Overhaul (MRO) of aircrafts, air-cargo, and creation of a regional hub for airline operations, aviation training and back office activities.

Table 3

Airport	Aircraft Movement (nos)	Passengers (lakhs)	Freight (in MT)
Ahmedabad	62,129	91.74	91,633
Vadodara	7,338	10.08	2,308
Rajkot	4,499	3.65	289

Urban Transport

In a globalized scenario, cities and towns play a critical role in the economic growth and development of the nation. As per projections Gujarat's urban population is expected to increase from 2.57 crore (25.7 million) in 2011 to 3.40 crores (34.00 million) in 2021. Gujarat's urban population is expected to increase from 2.41 crore in 2011 to 3.40 crore in 2021. There are 162 Municipalities and 8 Municipal Corporations, totalling 170 Urban Local Bodies (ULBs) functioning in urban area.

Urban Transport plays a pivotal role in infrastructure development. Government of Gujarat has made lot of efforts to promote safe, reliable and affordable city mobility. Wide-ranging plans have been set in motion to achieve the target of efficient transport systems. Key projects like Viability Gap Funding (VGF) for City Bus Services, implementation BRTS in three cities, Metro Rail Systems in Ahmedabad, Setting up of command and control rooms in all six Smart cities, Encouraging Non-Motorised Transport (NMT) in all 31 AMRUT mission (Atal Mission Rejuvenation and Urban Transformation) cities, developing of multi-level parking complexes in Ahmedabad and Surat, introducing Smart mobility cards in Ahmedabad, and Surat etc., Brief details for each initiatives are as under:

City Bus Service:

Most Gujarat towns have limited city bus service. Out of total 170 ULBs of Gujarat, 12 municipalities and 8 Municipal Corporation have limited City Bus Service, operated by PPP mode. It is observed that, the principal challenge in City Bus Service is viability of operations. This viability gap arises due to several factors such as keeping fares affordable, need to provide concessions to students, physically challenged and other such groups, low occupancy on certain routes due to competing unorganized, illegal and highly unsafe para transit (such as pooled autos) and so on. Therefore, Government of Gujarat recently, introduced Viability Gap Funding (VGF) under Chief Minister Urban Bus Service Scheme to promote city bus services in cities having population more than 1,00,000. This is a unique scheme in the country. As per the VGF scheme, State Government will give grant of 50% of total expenditure occurred by to all cities having population of more than 1,00,000 for running City Bus Service on PPP mode. Total allocation of Rs 290 crore is made for FY 2018-19 by the State Government. To ensure, the sustainability of the VGF scheme State will allocate this grant for seven years and allow appropriate rise in ticketing.

Bus Rapid Transport System (BRTS):

1. Gujarat is performing very well in operationalization of Bus Rapid Transit System. In three cities of Gujarat, BRTS are running successfully since it started. Janmarg, Ahmedabad BRTS is considered as the best in the country. Janmarg- BRTS project has won multiple accolades at national and international level. It has 97 kms of road with about 1.5 lakhs passengers are travelling every day. Surat BRTS is known as Sitilink and it has 102 kms of exclusive BRTS road and having more than 75,000 passengers travelling by BRTS. Similarly Rajkot has Rajpath BRTS with 11 kms of road length and 15,000 passengers using it every day. Gujarat is also planning to introduce Electric Buses at Ahmedabad BRTS and Rajkot BRTS to reduce emission.

Metro Rail Transit System (MRTS):

The first Phase of Ahmedabad Metro Rail is at an advanced stage of completion. The proposed Metro alignment of Phase-I provides North-South connectivity as well as East West connectivity in Ahmedabad city and Phase-II connects it to Gandhinagar as well as GIFT city project. The detailed network plans are mentioned in Table 4.

Table 4

	Total length (km)	No. of stations	Completion Year
Ahmedabad Gandhinagar Metro Rail Phase-I			
East - West Corridor (Thaltej Gaam to Vastral Gaam)	21.16	17	2021

North -South Corridor * (APMC to Motera Stadium)	18.87	15	
Total	40.03	32	
Ahmedabad Gandhinagar Metro Rail Phase-II			
Line-I,II&III	34.6	21	2022-23

Ahmedabad has planned for a multi-modal integrated system, where the proposed Metro will complement the existing GSRTC, Indian Railways, BRTS and AMTS services. For an integrated approach in planning and management of urban transport, a statutory body such as UMTA should be constituted by the Government. The increased shift is targeted from private mode to the public transport mode to 53% by 2043 with the implementation of Ahmedabad Gandhinagar Metro Rail Project.
In the crediting period an annual average emission reduction of 1.38 lakh tonne CO_2 is estimated. Revenue generations of 30.68 lakh and 41.34 lakh are estimated in year 2031 and year 2043 respectively, through carbon credits.

Setting up of command and control rooms in all six Smart cities:

Ahmedabad, Surat, Vadodara, Rajkot, Gandhinagar and Dahod are selected Smart cities the mega mission of Government of India. Out of these Ahmedabad, Surat, Vadodara and Rajkot have already developed and set up Command and Control Room to monitor traffic across the city under Smart city mission. In similar ways, Gandhinagar and Dahod are also developing command and control rooms. Ahmedabad, Surat command and control rooms won Smart city awards.

Promoting Non-Motorised Transport (NMT) including developing Public Bicycle Sharing (PBS):

Total 30 AMRUT Mission cities are also developing Non-Motorised Transport (NMT) infrastructure with AMRUT mission grant. All 31 AMRUT cities are constructing Footpaths (Pedestrian pathways) to cover main city roads. Besides, 16 AMRUT cities are also developing exclusive cycle tracks. Works are already stared in most of the cities.
Three cities Ahmedabad, Gandhinagar and Rajkot have Public Bicycle Sharing System on PPP mode. Surat is also developing state of art PBS system.

Air Quality Monitoring Station:

Ahmedabad, Gandhinagar, Surat and Rajkot have already developed Air Quality Monitoring System. These are also being published in public via digital sign boards at important locations of the cities.

Parking:

Ahmedabad and Surat have developed off street multi-level parking complexes. Rajkot, Vadodara, Gandhinagar and two to three municipal towns like Anand, and Vapi are also developing Multi level off street parking complexes.

Gujarat Mobility Vision 2030

VISION:

"To seamlessly provide inter-modal, shared, clean, connected, inclusive, safe, economical and zero emission transport to citizens across urban and rural areas."

State Strategies for Mobility

The key element of Mobility is accessibility, i.e. to easily reach one's destination. In order to achieve efficient and sustainable traffic flows, the state must change focus from moving vehicles to moving

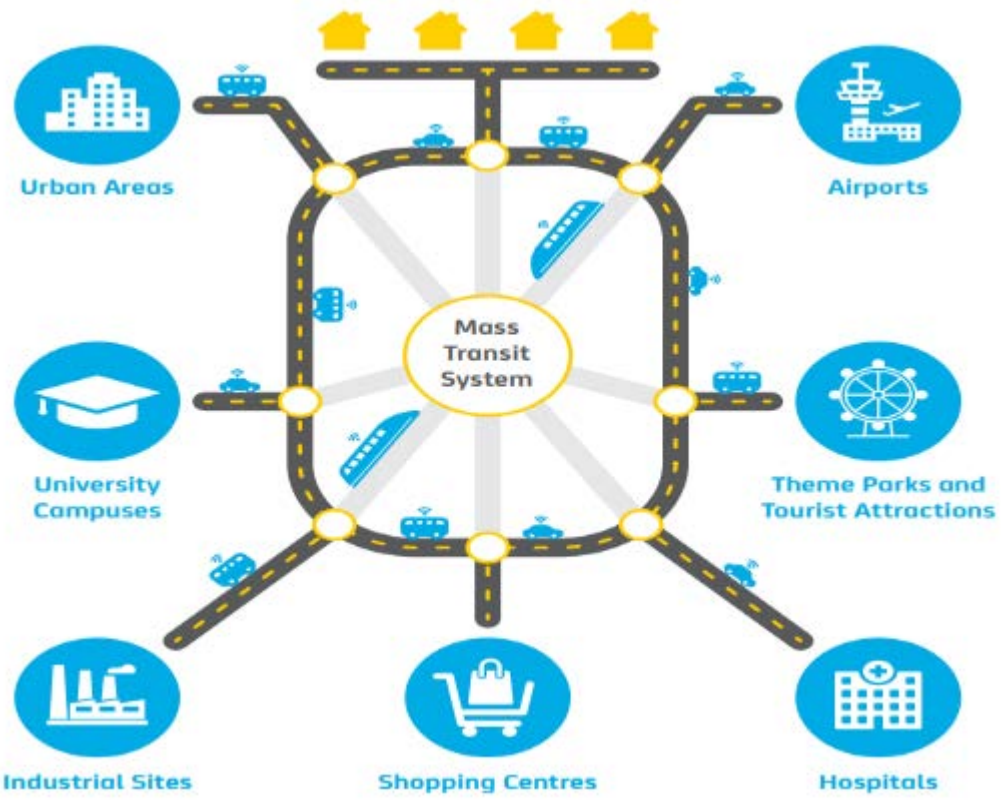
people and goods. This includes taking into consideration the entire journey from start to finish, which is generally accomplished through a variety of means of transport.
The gap between the current capacity of transport sectors of the state and the target where state wishes to reach can be bridged by pursuing different strategies and programmes. It is very essential and important to choose alternative strategies for meeting the gap. Selection of a strategy is an extremely important constituent of a Mobility Vision Plan 2030 of the State. It is also important to involve stakeholders, which is ensured with the formation of task force. Here it is attempted to form sectoral strategies, as per the discussions and deliberations, considering stakeholders suggestions etc.

Allows users to access transportation services on an as-needed basis:

Fully automated on-demand cars, taxis and shuttles will enable people to access transport more efficiently and conveniently by solving the “first mile last mile” access dilemma. Consequently, door-to-door transportation solutions can be presented as real alternatives to private car journeys, making individual vehicle ownership far less necessary and less desirable. Shared mobility is an umbrella term that encompasses a variety of transportation modes including

- Car sharing
- Automated mobility
- Public Bicycle Sharing (PBS)
- Charging Station for EV
- On-demand ride services
- Maximising Public Transport including promoting GSRTC & MRTS/ BRTS/City Bus services

How automated shuttles/cars can solve the last mile connectivity problem.



Technology should be opted for creation of a robust data security framework. Exploring different business models: Intermediary services, Ride sharing, Vehicle sharing Aggregators and Fixed-route commuter services.

Target for ZERO Emission by 2030

- Develop Pedestrian and Cycling infrastructure to promote Non- Motorised Transport (NMT)
- Cater to special sections of the society such as differently abled, senior citizens, children, and pregnant women
- Promote Electric Vehicle (EV) including Public Transport
- Promoting Electric Vehicle market segments based on Total Cost of Ownership (TCO)
- Supported by energy measures: SMART grid, energy storage solutions, optimization of the energy mix\
- Some estimates contend that transport energy consumption could be reduced by up to 90 per cent compared with current levels in an electric and automated future[3].

Freight

- Utilisation of Maximum use of Rail network
- Scientific Logistic Movement –
- Development of smart port cities
- Leveraging the potential Coastal Shipping
- Development of more jetties and logistic facilities at ports by using PPP
- Integration of road rail network with Ports, SIR, SEZ & DMIC
- Need for a unified body across sectors/modes
- Impetus to multi-modal freight aggregators
- Large multi-modal logistic hubs at Ports, SEZs, SIRs
- Promoting Zero/Low emission vehicles for Freight Movement
- Adopting technologies for seamless freight movement

Rural Mobility

- On-demand mobility - last mile connectivity
- Strengthening GSRTC
- Increasing frequency, penetration, quality & safety
- Maintenance of existing infrastructure
- Shared mobility in waterways(& other forms) - including electrification
- Create electric shared mobility ecosystem for farm logistics- including agriculture, construction & forestry machinery
- Use of satellite imaging to create unique village level solutions

Parking & Congestion Charge

- Sufficient parking space at Metro Stations, Government Buildings, and Important Building shall be provided.
- Introducing Parking ON & OFF parking charges in all municipal cities
- Congestion charge in walled city area to discourage to utilise own vehicle in municipal corporations area
- To control On street parking – facilitate Off street parking
- Use of PPP in parking development
- Use of Technology & Common Card for parking
- Development of open spaces to minimise encroachment
- Reduction in cattle nuisance by impounding and levying penalties

Car sharing and ride sharing have the potential to free up car parking capacity by removing privately-owned vehicles from the road. With private vehicle ownership set to decrease as with rise in car sharing services and cab aggregators, parking and associated infrastructure will be impacted.

Densification and congestion are affecting many urban areas, and trends towards the removal of parking spaces (particularly on-street) are evident – projects such as the construction of bicycle paths and BRTS will claim dedicated parking spaces. With fewer spaces available, jurisdictions should consider prioritising shared vehicles by offering parking incentives or benefits. At present, the use of

multi-level parking complexes has to be promoted. Most of the multi-level parking complexes built in the state haven't been a success and are merely defunct now (Table 5).

Table 5

AMC Parking	Cars	Two-Wheeler	Actual average usage
Kankaria	250	350	1
Navrangpura	400	200	150
Relief Road	185	221	80
25 plots	1000	NA	200

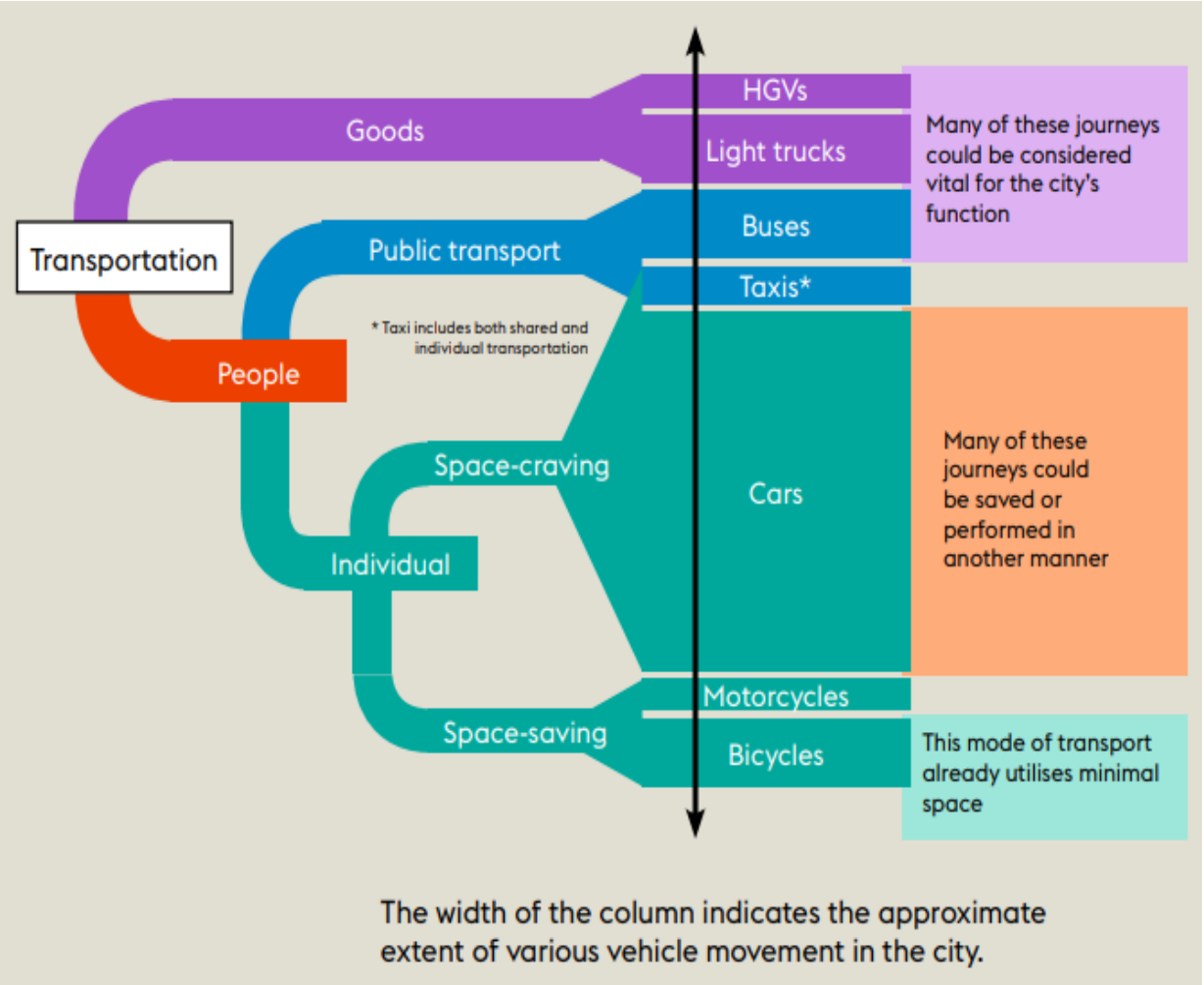
Reduction of Fatal Accident by 50% in year 2020

- Enforce Road Safety Act 2018
- Automated tool proof driving tests
- Using Education -Enforcement -Engineering mechanism to reduce fatal accident
- E-challan and Cancellation of driving licenses if found habitual offender

Urban Transport

- Improving usage of public transport (buses and metro rail) by making it efficient, comfortable and affordable in all municipal towns
- Promote BRTS in all municipal corporations and metro rail in Ahmedabad and Surat
- Fare Integration, use of smart mobility card to promote fare integration to create economic benefits to end users.
- Promote Green Urban Transport solutions like development of Non Motorise Transport (NMT)
- Seamless multi-modal transport
- Parking Demand Management by development of Pay and Park multi-level parking Complexes in all municipal corporation area to ensure availability of sufficient parking space to reduce traffic congestion and to make appropriate provision for Sufficient Parking space at Metro Stations, Govt Buildings, and Important Building
- Congestion charge in walled city area to discourage to utilise own vehicle in municipal corporations area
- Emphasis on Intelligent Transport Systems
- Safety and Security for Urban Transport users (Surveillance systems, better street design)
- Establishing UMTA (Unified Metro Transport Authority) for Four Municipal Corporation Area
- Innovative financing mechanism in urban transport (promotion of non-fare revenue and creation of Urban Transport fund)
- Development of open spaces as gardens, parks, parking spaces, civic service public available in cities so that, encroachment can be avoided
- Development of hawkers zone and open markets to eliminate road side encroachment and caring urban poor
- Reduction in cattle nuisance by impounding and levying penalties
- Improving usage of public transport (buses and metro rail) by making it efficient, comfortable and affordable in all municipal towns

How individual road users should use the city's streets and roads, the vehicles they travel in and the parking areas where the vehicles are kept, to ensure the system is as efficient as possible is also part of the urban mobility strategy. It is not only government agencies that influence traffic. Traffic is also strongly impacted by behaviour of individual road users.



Planning of city infrastructure:

Population growth in the major cities and the region is of such an extent that even the major investments in new roads and rail lines will be insufficient and significant capacity deficiencies will continue to exist in parts of the transport system even after these expansions. Government transport and other operators with responsibility for the region's transport system must add capacity to enable more people and more goods to be transported in the same space.

People's Participation

- Use of I-E-C like informative and interactive website/ Social media / Radio/ TV/ Cine slide/ Video Clips
- Voluntary services cell for Traffic should be set up where citizen can deliver volunteer service
- School Children Traffic Awareness Programmes
- Skilled manpower in Transportation
- Use of Smart Camera & CCTV for e-challan
- Central data centre for monitoring traffic across the state
- Strict implementation of Traffic rules

State Action Plan for Mobility

Strategy Action	Short Term (Up to 3 years)	Long Term (Up to 10 years)
Shared Mobility	• Promoting ride sharing, vehicle sharing, fixed route commuter services and incentivize the aggregator services • Improving usage of public transport (buses and metro rail) by making it efficient, comfortable and affordable in all municipal towns and providing VGF for city bus service in cities having more than 1,00,000 population	• Implementation of Intelligent Transport Solutions (ITS) and Digitalization in operations of the shared mobility services. \ • Promote BRTS where it is operationalised. • Metro rail for Ahmedabad will be expanded and preparation for Surat Metro will be initiated. • To ensure seamless multi-modal transport like fare integration, development of multi modal hub, common card etc., will be developed. • Public Private Partnership will be encouraged for better service • To create an adaptive robust and intelligent systems available for seamless planning, booking and payment in multimodal trips. • To have better management of traffic and transport in bigger cities, UMTA (Unified Metro Transport Authority) will be established in four Municipal Corporations. • Implementation of AI and block chain technology
Non-Motorized and Inclusive Transport options	• Develop pavements, walkways and cycle tracks in the urban areas. • Launch e-rickshaws on large scale in all major cities, district centers and towns	• Planning and modification of urban infrastructure to make the cities walkable and major destinations approachable on foot or on bicycle. • Promoting Green Urban Transport solutions like development of Non Motorise Transport (NMT) , Electric vehicle etc., • Create a level of accessibility that is not built solely and dependent on mobility
Multi-modal transport	• Create a number of multi modal hubs in the 4 major cities, providing connectivity from Railway Stations, Bus Stations and Airports to different parts of the city by Public Transport. • Develop system for a common pass or payment for the use of entire multi modal system in a single urban location.	• Integrate mobility through road, rail, water and air on a single system • Create a robust database of services and the operational information to be provided to users/commuters for better and timely planning of their journeys • Connect metro lines with railway stations to provide last mile connectivity

Freight Movement	• Subsidize and promote usage of electric and hybrid vehicles for transportation of goods within urban limits • Enhance and improve usage of Railways for freight movement to reduce traffic and emissions due to freight movement across the state	• High Scale implementation of policy changes to adopt EV usage for freight movements • Development of Infrastructure to support EV freight movements - charging stations on Highways, undeterred power supply, high scale manufacturing of EV vehicles to meet the demands. • Incentivizing policies for transport companies to shift 100 % to EVs.
Roads and Infrastructure Development	• Non-connected villages and hamlets to be connected by all-weather roads in 3years • Construction of 2750 kms of road to achieve 100% rural connectivity • GSRTC has planned to open 9 new bus terminals on Design, Build, Finance, Operate & Transfer (DBFOT) basis at Rajkot, Palanpur, Amreli, Modasa, Bhuj, Nadiad, Patan, Bharuch & Navsari	• All railway crossing having high traffic density is planned to be eliminated by providing ROB / RUB • Planning is under consideration to provide flyovers and Road under bridges for busy junctions on important state highway • Looking at the Industrial growth of Gujarat special thrust is given to 4 laning of roads connecting to Industrial area, SIR/SEZ to facilitate better movement of cargo and passengers
Safety and Security and Parking Space	• To prepare parking policies in municipal corporations after making appropriate Parking Demand Management • Improving levels of safety and security in Urban Transport by increased surveillance • Setting up Command and Control Room at 6 smart cities - Ahmedabad, Surat, Vadodara, Rajkot – set up completed Gandhinagar and Dahod – set up in process	• Considering importance of road safety, safety audit is made compulsory in all works of more than 5KMs length .
Modernization of RTOs and Regulatory methods	• Expansion of the current driving license related services • Develop mobile apps for payment of e-challans and create integrated MIS for all RTO related services – registration, permits, renewals etc	• Front office automation through outsourcing to external agencies for digitalization – booking an appointment, registration, payment, e-challans at a planned cost of INR150 Cr
Use of Coastal and Waterways Infrastructure	• Passenger Ferry Services have already started between Dahej and Gogha and RO-Pax ferry services shall commence later this year • Development of 4 new ports on PPP model – Chhara, Dahej, Nargol, VansiBorsi	• Expansion plans for RO-Pax ferry services in Gujarat and to other states. Probable future developments: ▪ Development of RO-Pax terminal at Surat ▪ Development of passenger ferry between Port Victor-Surat, Surat-Mumbai, Mandvi-Okha and Porbandar-Mumbai

Summary

Gujarat has seen an unprecedented upsurge in economic growth. It has a strong network of all transport modes – good road network, railways, ports and airports available in the state to take care of rural/urban, passenger and freight. Increased traffic has had adverse effects like air pollution, congestion, rise in road accidents, problems of parking space etc. This report attempts to document these challenges currently being faced, the present capacity and status of transport system in the state of Gujarat and some suggestive strategy action plans to tackle these challenges to create a sustainable model for mobility.

The following are summarized suggested action points:

- Improving usage of public transport (buses and metro rail) by making it efficient, comfortable and affordable in all Municipal Towns
- Promote BRTS in all municipal corporations and Metro Rail in Ahmedabad and Surat
- Provide user-friendly information on public transport
- Parking demand management by development of Pay and Park multi-level parking complexes in all municipal corporation area to ensure availability of sufficient parking space to reduce traffic congestion.
- Safety and security for Urban Transport users (Surveillance systems, better street design)
- By use of VGF, it is intended to start or strength city bus service by launching Chief Minister Urban Bus Service in all municipal cities having population of more than 1,00,000. This will add more than 2800 buses in 30 cities of the State
- Ahmedabad Metro Phase -1 will be operationalised
- All municipal corporations will prepare and implement Parking Policy in their cities. It is also planned to have multi-level pay and park base multilevel parking complexes in all Municipal Corporations
- 30 cities under AMRUT cities will develop cycle track and footpath to promote Non-Motorised Transport (NMT). It is also planned to develop exclusive cycle track in Gandhinagar to guide other cities of Gujarat.
- To reduce traffic congestion and to encourage people to use Public transport, on pilot basis Congestion Charge for wall city area (Gamtal area) will be introduced in Ahmedabad and Surat
- Use of E-buses for Ahmedabad and Rajkot as well as between Gandhinagar- Ahmedabad will be started on pilot basis.

Haryana

Introduction

Haryana is a land locked state in northern India that lies between 27°39 N and 30°35 N and between 74°28 E and 77°36 E. The altitude of Haryana varies between 700 ft and 3,600 ft above sea level. At 44,212 sq km, Haryana covers 1.34% of India's geographical area and is home to 2.53 crore people that is, 48.58 lakh households (30.44 lakh rural plus 18.14 lakh urban) comprising 2.9% of India's population. The population density of the state is 573 persons per sq km with a sex ratio of 879 females per 1,000 males. Though Haryana has witnessed gradual urbanization since 2001, as per the Census of 2011, 3 65.1% of its population (1.65 crore persons) still lives in rural areas a drop of 6 percentage points from 71.1% recorded in the Census of 2001. Haryana is divided into six administrative divisions and has 22 districts constituted by 140 blocks, 154 towns and 6,841 villages. With the fast- paced economic growth of India, Haryana too has witnessed healthy growth in its gross state domestic product (GSDP) averaging 8.6% per annum since 2004-05 making it a significant contributor to the national growth story.

Since 2004-05, Haryana has outperformed the national GSDP growth rate for 9 out of the 13 years. In 2016-17, Haryana reported a per capita income of 1,80,174 per annum as compared to the national average of 1,03,818.

The state has achieved significant milestones in its endeavour as a hub for industrial products evident from the fact that Haryana today is a major contribution of passenger cars, motorcycles, tractor, bicycles etc. However, the key issue now is to sustain his momentum.

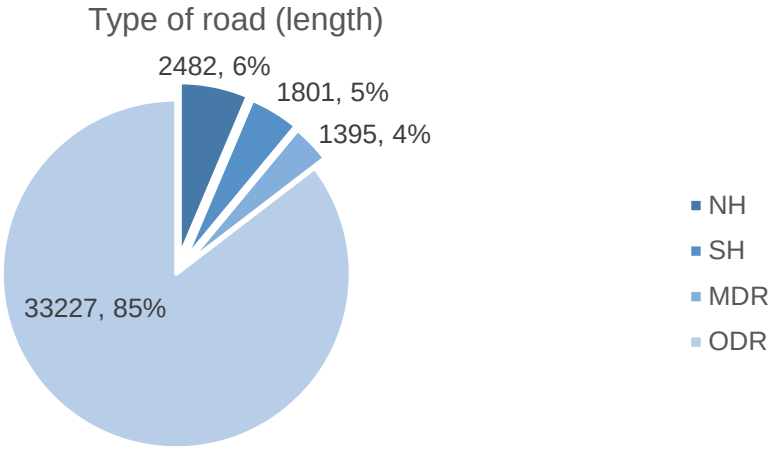
Major National Highways that pass through Haryana connecting southern, western and eastern India provides efficient logistics and transportation to sustain state industrial and manufacturing needs. Prominent Airport of India i.e. Indira Gandhi International Airport, New Delhi is just 5 Kms from the Haryana border. National capital Delhi is covered by Haryana from three sides. Exit or entrance to Delhi passes through Haryana.

Haryana at glance

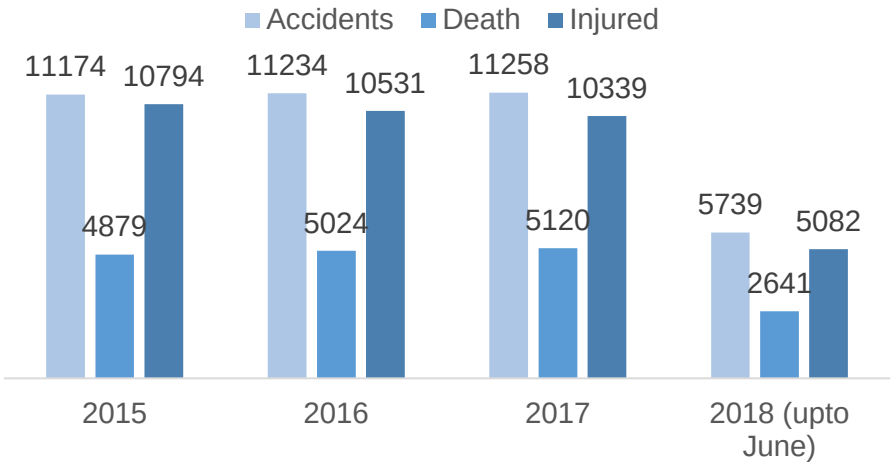
Total Population (2011)	2.54 Cr.
Urban Population	88,42,103
Rural Population	1,65,09,359
Male Population (Urban)	47,20,728
Male Population (Rural)	87,74,006
Female Population (Urban)	41,21,375
Female Population (Rural)	77,35,353
Density	573/Km^2
Total Road Length (as on 31.03.2016)	38905 Kms.
Number of Districts	22

Number of Registered Vehicle (till 24.07.2018)	86,72,121
Number of Driving License (24.07.2018)	34,44,961
Regional Transport Authorities and RLAs	97
Traffic Police Stations	23
Traffic Police Posts	5
Number of Haryana Roadways Buses (Ordinary, Super Luxury) as on 31.06.2018	4081
Haryana Roadway Depots	24
Haryana Roadways Sub-Depots	12

Different types of Roads in Haryana (As on 30.03.2016)



Road accident data



Vision for transformative Mobility

"To provide safe, clean, inclusive and economical transport service to citizens across the Haryana."

To ensure this, it is important to develop a vision along with strategies for its successful implementation. The major areas of focus for the Haryana mobility Vision are as follows:

- Providing adequate transport services
- Addressing city wide traffic congestion issues
- Safety & accessibility of all travel modes for road users
- Inter connectivity of different modes of transport to ensure last mile connectivity.
- Future transportation trends.
- Hassel free travel for passenger as well as goods vehicles which is safe, user friendly and cost effective.

Situation analysis of mobility scenario

Review of existing transport scenario

3.1.1. Roadways

Haryana has total road network of 26,016 km out of which 2,482 km constitute national highways and 1,801 km are state highways which cater to approximately 85% of the total state traffic. With 27,006 km of metalled roads, Haryana is among the few states with almost 100% metalled road connectivity to rural areas. In addition to this, two major projects have been developed in partnership with the Government of India which led to better connectivity within Haryana.

These two projects are:

The Dedicated Freight Corridor: In order to leverage investments along the Dedicated Freight Corridor from Delhi to Mumbai, the Government of Haryana is planning to build an integrated multi-modal logistic hub in Southern Haryana to cater to the entire NCR, a global city in Gurugram district and a mass rapid transit system (MRTS) connecting Gurugram Manesar- Bawa.

The Kundli-Manesar-Palwal (KMP) Expressway: Designed as a 136 km long, six-lane expressway project with a potential industrial corridor of 27,200 hectares (67,000 acres) with

1 km of controlled area on either side, this expressway will connect four crucial national highways: the NH -1 ,NH-2 , NH–8 and NH -10.The K M P Expressway will act as a high-speed link to northern districts in Haryana, from southern districts, including Gurugram.

Table 1

Type of roads in Haryana	Length (kms)
National highways	1,346
State highways	2,559
Major district road	1,569
Other district roads	14,730
Village roads	2,852
Total	**23,056**
Source(Web): State PWD B & R	

Railways

Haryana is benefited from 4,262 km of railways tracks laid down during 2015. Haryana government also plans on High speed rail transit project which will connect the transportation facility of people residing area between Deen Dayal Upadhyaya Railway Station (Sarai Kale Khan) in Delhi to the Rajasthan –Haryana border area near Shahjahanpur –Neemrana – Behrrod. This project will cover 100km from Delhi to Haryana-Rajasthan border, project cost for phase 1 is approximately Rs 25,000 crore at which will connect the line till Shahjahanpur- Behrod.

Airports

Haryana has five civil airstrips at Pinjore, Karnal, Hisar, Bhiwani and Narnaul. Three fight training centres have been established at Pinjore, Karnal and Hisar by the Haryana Institute of Civil Aviation, a move that allows successful students to obtain numerous certifications, including a private pilot license, commercial pilot license, assistant flight instructor rating, flight instructor rating and instrument rating.

A new terminal at the Chandigarh airport was inaugurated. The terminal is capable of handling both domestic and international fights. The Airports Authority of India bare 51% of the airport construction cost to the tune of 475 crore. The state governments of Punjab and Haryana bare the remaining cost equally.

3.2. Analysis and Indicators

Mobility

Mobility has the potential of becoming a growth engine for energizing economies and act as a catalyst for creating multitude of employment opportunities. Mobility is inextricably linked to every aspect of our life and has the potential to shape our country in the coming decades. Accordingly, a task force on mobility has been constituted under the chairmanship of Chief Secretary, Haryana with the Administrative Secretaries of different departments and Transport Commissioner as Member Secretary.

The objective of the constitution of the Task Force is to guide development of a Mobility Action Plan addressing city wide traffic congestion issues, the safety of all travel modes and road users and future transportation trends, such as autonomous vehicles.

Infrastructure and Land use

- Haryana Roadways is having 24 depots and 12 sub-depots across the state.
- Haryana Roadways Engineering Corporation has been setup at Gurugram for fabricating the buses.
- Three IDTRs at Rohtak, Bahadurgarh and Kaithal are functional in Haryana State for imparting training to the drivers.
- Foundation stone of IDTR, Karnal has been laid down by Hon’ble CM on 30.03.2018.
- More IDTR’s are going to be established in Bhiwani, Nuh, Palwal, Faridabad, Rewari, Gurugram and Karnal districts. The matter is under active consideration.
- 22 Driver Training Schools being run by Haryana Roadways in their workshop premises are imparting training to the drivers for the grant of transport licence.
- An automated Inspection & Certification Centre for Inspection of Motor vehicle is functional at Rohtak.
- Approximately 32000 Heavy vehicle drivers are trained every year.

- More than 50000 drivers are sensitized through refresher courses by these institutes/schools.
- In the development plans of various districts/sub-districts sufficient land is being provided for transport sectors i.e. bus stands, workshops. The possibilities to provide sufficient place for non-motorized transport modes such as cyclists, push-scooters, auto-rickshaws, hand carts etc in the development plans are also being explored.

Safe driving

Safe driving is an integral part of the mobility strategy. The goal of safe driving can only be achieved by taking adequate road safety initiatives, proper driver training, education & public awareness, training, enforcement & Emergency care. The steps taken by the state are enumerated below: -

Road safety

- The Hon'ble Chief Minister of Haryana Shir M.L. Khattar launched Haryana vision Zero program in July 2017 to reduce road traffic fatalities in public private partnership with Nasscom, WRI India and Honda in the similar line of Vision zero Sweden.
- Haryana Road Safety Policy has been formulated on 31.03.2016.
- State Government has setup Lead Agency to act as the 'Secretariat of the State Road Safety Council' to coordinate all activities relating to the road safety in the State, which would include the functions of the Police, Public Works (B&R) Department, Education
- Department, Local Bodies, Non-Government Organization and other department concerned with the road safety from the office of the Transport Commissioner.
- Road Safety Fund has been created under the Haryana Road Safety Fund Rules, 2018, in which, provision has been made to utilize 50% of the amount collected by the enforcement agencies as compounding fee in the previous financial year. An amount of INR 31.00 Cr. has been released to the lead agency as first installment during the 2018-19.
- State Road Safety Council under the Chairmanship of Transport Minister has been re-constituted.
- District Road Safety Committees under Deputy Commissioner concerned has been constituted.
- Fund Management Committee under the chairmanship of Chief Secretary, Haryana has been formulated for management/monitoring the Haryana Road Safety Fund.
- Separate Road Safety wing has been established in Transport Commissioner office.
- Protocol for Black Spots and formulated for regular identification and rectification of Black Spots and to reduce the road accidents/fatalities.
- State & District Level Coordination Committees for protocol have been constituted to reduce accidents on Short, Medium and Long term basis.

Education and public awareness

- Road Safety Education related content has been incorporated in the textbooks of Environmental Studies subject for classes IV and V. Similarly in the textbooks of Social and Political Life subject for classes VI to VIII. As far as IX & X classes are concerned, contents on Road Safety have been included in the books of English & Hindi.
- Road Safety Clubs established in all Colleges and Senior Secondary Schools in the State
- Essay competition organized in all the Senior Secondary Schools across the State on 26.02.2018.

- Quiz/Essay/declamation/painting/poster making competitions/ seminars on road safety are organized in Schools & Colleges in Haryana.
- Seminars conducted in 4 Government colleges at Ambala, Gurugram, Sonipat and Charkhi Dadri.
- Social organizations/societies/NGOs are being encouraged to enhance road safety awareness.
- Police department, Education department and all Registering & Licensing Authorities actively participate in Road Safety campaigns in their jurisdiction.
- Short films on Road Safety are distributed in all districts for broadcasting in Cinema Halls/Malls, School, Colleges, Clubs, Transport Unions in the State for the awareness of general public.
- Road Safety awareness is being spread through Radio FM channels/leading newspapers.
- Sadak Surksha Chetana Yatra was organized in the State from 9th February to 13th March, 2018.
- National Road Safety Week is to be organized from 23rd to 30th April, 2018.
- Six Traffic Parks have been developed at Faridabad, Gurugram, Sirsa, Panchkula, Karnal and Kaithal for imparting training to the People regarding Road Safety and inculcating habit of observing traffic rules.
- Special random campaign to check overloading by goods/passenger vehicles, driving without helmets/seat-belts, dangerous driving etc. are being carried out from time to time.
- A MoU has been signed by the Transport Department on behalf of State Government with WRI & NASSCOM on Haryana Vision Zero, Road Fatalities Initiative on 02.05.2017 at Gurugram.
- Road Safety Associates has been deployed in 10 districts i.e. Gurugram Panipat, Karnal, Jhajjar, Ambala, Hisar, Kurukshetra, Sonipat, Rohtak & Rewari w.e.f. July, 2017 for performing the Road Safety activities.
- A MoU has been signed by the Transport Department on behalf of State Government with SABMiller India Ltd. for “Safer Roads Initiative” in Gurugram district.

Enforcement

- E-challaning has been introduced from 15.12.2017 in the entire State.
- 23 Traffic Police Stations equipped with ambulances, interceptors, crane, gypsy, motor cycle, alco-sensor, camera and saw machine.
- 1577 Police officers/officials are posted to regulate the traffic in the State.
- Speed limit has been fixed for all type of vehicles on different roads/highways to maintain safety.
- 20 fresh locations have been identified by the Police Department on National Highway No.1 to install CCTV cameras for checking speed.
- 45 Traffic Assistance Booths have been set-up every 10 Kms along National Highway No. 1 (20), NH-2 (12) and NH-8 (13) to provide help to accident victims, securing scene of accidents/ Photography and removal of vehicles/ clearing traffic.

Training

- The training for all Highway Engineers/field officers is being conducted and 77 Engineers have been trained on Road Safety.
- A workshop was organized on 6th December, 2017 at Chandigarh with Society of Indian
- Automobile Manufactures (SIAM) on Vehicular Technology, Inspection and Certification regulations in India
- Workshop of Road Safety Engineering departments on road Safety aspects was organized on 10.04.2018 at Gurugram.
- Total 1166 Police personnel were trained in “Basic Life Support and Paramedic Training” from 16 Civil Hospitals or renowned Hospitals in Haryana like Fortis, Max, Medanta, Artimis Hospitals etc.

Emergency Care

- There are 7 Trauma Care Centers in the State and proposal for establishment of 13 Trauma Care Centers is under consideration.
- 43 ambulances of Police Department with 1073 toll free number and 382 ambulances with 108 toll free number of Health Department are available for road accident emergency services in the State
- Training is being given to the drivers in First Aid Trauma care from time to time by the departments such as Transport, Health and Police.

Environment impacts

The mobility strategy doesn’t talk in terms of safe and seamless travel only but is also instrumental in providing healthy environment to the road users by creating ambient air quality. The electric vehicles are required to be promoted by creating an appropriate infrastructure and giving relaxation in the taxes and government levies. At present, a rebate of 20% in the taxes for the electric vehicles is being given by the State Government which is likely to be increased further upto 30% to promote the same. Further, E-rickshaws and e-carts are being registered in the state of Haryana and a policy in this regard has been formulated.

Challenges and opportunities

Existing opportunities

Some of the excellent existing opportunities that should be definitely emphasized upon for the smooth implementation and planning of the mobility plan are as follows:

- Enhancement in the fleet of Haryana Roadways.
- Providing city bus services by the Municipal Corporations in the state acting as state transport undertakings.
- Deployment of existing manpower.
- Employment generation.

Challenges

However, in addition to the opportunities, there lies a number of challenges as well which has to be taken care of for the implementation of the same and these are as follows:

- Emissions

- Congestion
- Infrastructure
- Safety for road users
- Affordability
- Service Quality
- Institutional Framework
- Skilled Resources
- Human behaviour

Objectives for mobility

- The strategy is devoted to set the conditions for a coherent long-term (for year 2041) transport plans for the State.
- To identify existing challenges related to walking, cycling, public transport, private vehicle mobility and other aspects of the transport system.
- Adequate, efficient, economical and safer movement of people and vehicles.
- Economic development both in urban and rural areas.
- Change the human behavior for safer mobility

Identify the key strategy level

Figure 1: Population Growth in last three decade

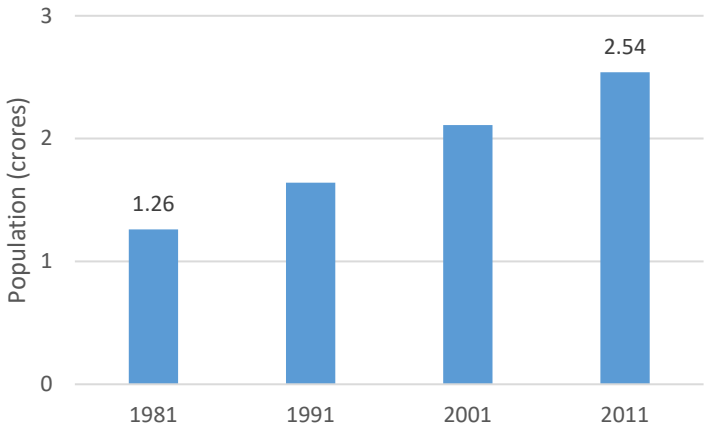
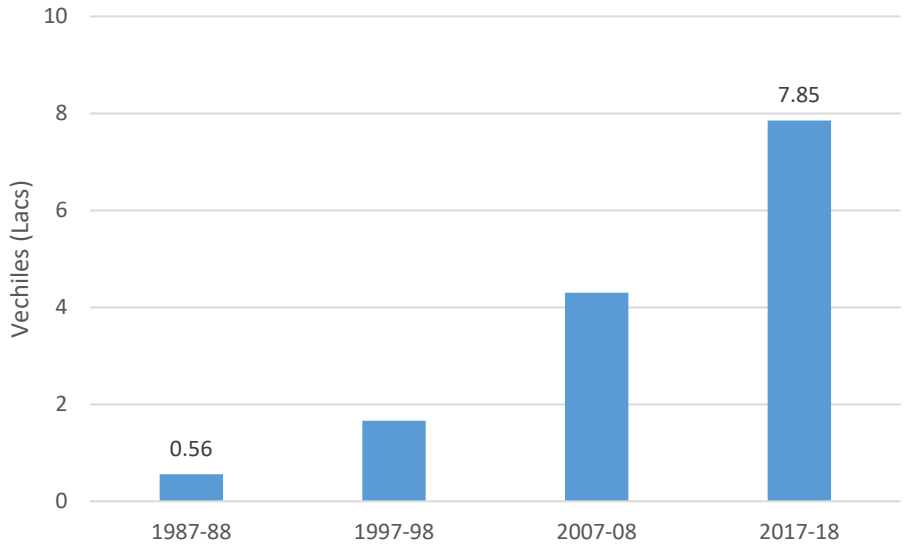


Figure 2: Vehicular Population in three decades



Present Strategy on mobility in Haryana according to Scenario in 2041

- Estimated Population : 5 Crore
- Estimated Vehicular Population : 4.63 Crore
- Total Area of Haryana at present : 44212 Sq. KM

The population of the state according to 2011 census was about 2.54 Crore which is likely to be enhanced to 5 Crore by the year 2041 having an estimated increase of 100%. The number of registered vehicles in the state till 24.07.2018 was 86,72,121 which are likely to be 4.63 crores by the year 2041 having an increase of 434%. The total area of Haryana at present is 44212 Sq. Km.

The key strategy lies in promotion of public transport system with maximum reliance on electric vehicles, pooling of private vehicles, addressing the congestion issues, last mile connectivity, safety of road users, zero emission and employment generation.

Smartphone apps for citizens. Functionalities offered by IoT and GPS used for public transport purposes. At the same time, customer expectations are on the rise. In an age of real-time communications, they are looking for smart solutions – that enable seamlessly coordinated travel across multiple means of transportation. They want to shift with speed and ease from trains and buses to car-sharing services or rental bicycles. And they want to plan their trip online or with a smartphone app. Moreover, they expect more precise, timelier information on departure and arrival times of trains, and buses – plus instant notification of delays, with advice on alternative travel options. Transportation operators must respond with state-of-the-art intermodal management systems – that make commuting and other forms of travel a simple, reliable, flexible and attractive experience.

Shared Mobility

Last mile connectivity should exist to put the commuters at ease. The distinction of public & private ownership should be removed, and a data security framework is required to be in place. The alternate modes of mobility should be promoted, and importance should be given to electrification of public transport.

Intelligent transport solutions and digitization

Public transport organizations face significant challenges. Locally, regionally and nationally, the most popular routes are struggling to keep pace with demand. Infrastructure is often operating at the limits of capacity. Even minor component faults or unexpected asset downtime can have a huge and lasting ripple effect, with delays impacting trains, buses, metros and trams for many hours. However, in the future, mass transit players will have to accommodate growing numbers of passengers-within the existing road. Efficient, uninterrupted transportation services will be crucial to fulfilling an ever more complex mandate with limited resources.

Intelligent solutions for information management, new mobility solutions, technologies for increased road safety, more-fuel-efficient drive systems: Continental is using the continuously growing possibilities of digitalization to help vehicle manufacturers, industries, and new market participants make mobility as enjoyable as possible. Haryana shall demand and promote technologies that improve comfort and convenience while driving – in combination with topics such as vehicle safety and sustainability.

Intelligent, efficient mass transit

Coordination of multiple means of transportation should be planned and there should be a form of integrated and seamless mobility for the customers with Multi-channel, multimodal ticketing systems

There should also be Real-time information for commuters and other users for the same which will do real time capturing of data on all vehicular movements and will be a Cloud based intermodal transport control system (ITCS).

Proper planning of routes should be done with provision of travel alerts, e.g., about delays, better quality information on travel prices and timetables, precise information about buses via GPS data. Lastly, Integration in WIMT (Where is My Transport) should be ensured.

Zero emission Mobility

Zero Emission Mobility (ZEM) is must to save the health of human beings and to create a healthy environment. The electric vehicles are required to be promoted by creating an appropriate infrastructure and giving relaxation in the taxes and government levies to combat the pollution and to improve the air quality. Future reduction of CO2 emission from passenger car will be strongly dependent on increased sale of alternatively powered vehicles, including electric, hybrid, fuel cells and natural gas powered vehicles.

Renewable Energy

Renewable Energy is energy that is collected from renewable resources, which are naturally replenished on a human timescale, such as sunlight, wind, rain, tides, waves and geothermal heat.

Renewable energy often provides energy in four important areas: electricity generation, air and water heating/cooling, transportation, and rural(off-grid) energy services. Renewable energy systems are rapidly becoming more efficient and cheaper. Their share of total energy consumption is increasing. It would also reduce environmental pollution.

Non-motorized Transport/Pedestrian facilities

The Non-motorized transport i.e. walking, bicycling, cycle rickshaws, push scooters and hand carts etc are the affordable transport options and are also instrumental to reduce the emission and inter-modal balance. All of them are green modes of transport; there carbon footprint is low, energy consumption is minimal, and their local emission are zero. Still non-motorized transport is too often neglected as a substantial mobility option in favour of capital and infrastructure intensive mode of transport. Pedestrian facilities include retail-shops, museums, mass-events, hospitals, transport hub, sports infrastructure and religious infrastructures. The transport mode in such infrastructures is mostly walking, with rare exceptions.

8. State action plan

Below is the detailed description of the action plan with key areas that needs the utmost importance, long with the action plan that is required for the enforcement of the implementation. This also contains the responsible implementing agencies and their deadlines for the same.

Sr. No.	Key action areas	Implementing Agency	Action Plan	Deadline
I.	**Enhancement in Public Transport**	State Transport Department	•Procurement of 365 new standard Non-AC buses. •Hiring of approx. 510 new buses under KM Scheme. •Hiring of 20 Super Luxury AC buses for long routes on KM Scheme. •Procurement of 150 standard HVAC buses (3×2 seater). •Procurement of electric buses. •Procurement of 150 Non-AC Mini Buses on hiring basis. •Promotion of Electrical vehicle.	2018 2019 2020 2020 2020 2019 2019
II.	**Safety & Security**	Transport, Police, Health, all Engineering Departments	•Identification of black spots •Identification of accident prone areas and rectification thereof •Setting up of trauma centres •Mobile ambulances having lifesaving instruments	2018 2019 2020 2020
III.	**Infrastructure**	All Engineering Departments	•Preparation of overpasses, pedestrian paths, widening of roads	2019
IV.	**Zero Emission**	Police, Transport	•Promotion of battery operated vehicles by creating infrastructure and rebate in the government levies. • Strict compliance of emission norms at all levels	2019 2019
V.	**Non-Motorized transport**	Urban Local Bodies, Town & Country Planning	• Preparing separate paths for walking, bicycling, cycle rickshaws, push scooters and hand carts etc • Pedestrian facilities	2020 2019

Sr. No.	Key action areas	Implementing Agency	Action Plan	Deadline
VI.	**Congestion**	Traffic police, transport	•Increased dependence on public transport. •Car pooling •Alternate modes of transport i.e. walking, bicycling, cycle rickshaws, push scooters and hand carts etc •Overpasses, subways, link roads •Erection of Traffic signals	2020 2019 2019 2030 2025
VII.	**Road Engineering**	All road Engineering departments	•To enhance the road length •Widening the roads •Accessibility/linking rural to urban routes •To maintain the road safety norms •Sign and signage's •Removal of encroachment	2025 2025 2025 2020 2020 2019
VIII.	**Intelligent Transport System**	Transport	•Mobile app/Passenger Information system •Fare collection system/E-ticketing •Vehicle Tracking system •Training to drivers/conductors etc. •Awareness in public •Setup of IT infrastructure	2019 2019 2019 2019 2019 2025

In the present era of digitization, ICT/ITS related transport infrastructure and services cansupport the management of travel demand needs including the reduction of travel where there are feasible alternatives in a cost effective, environmentally viable and energy efficient manner.

Commissioner of Transport under the Ports and Transport Department is the designated authority for the transport. The State Transport Department is responsible for issuing permits for autos and taxis and for approving the fare structures of state transport corporations that run buses.

9. Proposed institutional and regulatory reforms

Govt. of Haryana also initiated to make UMTA for Gurugram. However, it was decided to establish Multi- modal Transport Authority (MMTA) at state level. It is responsible for planning and implementation of all kinds of transport and mobility proposals in the State.

For urban centres with 1 million populations, a Unified Metropolitan Transport Authority (UMTA) needs to be created; for other urban centres, however, MMTA can be the nodal agency responsible for planning and implementation of urban transport projects.

The state is mandated with following national policies:

- Metro Rail Policy (National): The metro rail policy emphasizes that urban mass transit projects should be seen as urban transformation projects. It mandates (1) Public private partnership (PPP) for availing central assistance; (2) Transit Oriented Development (TOD) to promote compact and dense urban development; and (3) last-mile connectivity provision in catchment areas of 5 km radii around stations.
- Electric Vehicle and Energy Storage Policy 2017: The Government of Karnataka has approved the "Electric Vehicle and Energy Storage Policy" and plans to set up Electric Vehicle (EV) manufacturing zones and charging stations to make the State a hub for alternative fuels. It is estimated that the policy will attract investments worth INR 31,000 crores and provide employment to 55,000 people.

- Aerospace Policy 2013: The Aerospace policy was adopted to enable an environment of holistic and sustained growth of the aerospace sector and to position Karnataka as a globally recognized aerospace destination. Additionally, the policy aims to increase the contribution of the aerospace sector towards enhancing the share of industry in the State's GSDP from 28 percent to 32 percent by 2022.
- Infrastructure Policy 2007: The Infrastructure Policy has been formulated to provide a fair and transparent policy framework for facilitating economic growth and encouraging PPP in infrastructure development.

10. Conclusion

Haryana has seen an unprecedented upsurge in economic growth. It has a strong network of all transport modes – good road network, railways and airports available in the State to take care of rural/urban, passenger and freight. Increased traffic has had adverse effects like air pollution, congestion, rise in road accidents, problems of parking space etc. This report attempts to document these challenges currently being faced, the present capacity and status of transport system in the state of Haryana and some suggestive strategy action plans to tackle these challenges to create a sustainable model for mobility.

The following are summarized suggested action points as part of the Transformative Mobility:

- Improving usage of public transport (buses and metro rail) by making it efficient, comfortable and affordable in all Municipal Towns
- Promote city bus serivce in all Municipal Corporations and Metro Rail in Gurugram, Faridabad and Bhadurghar
- Provide user-friendly information on public transport
- Parking Demand Management by development of Pay and Park multi-level parking Complexes in all municipal corporation area to ensure availability of sufficient parking space to reduce traffic congestion.
- Safety and Security for Urban Transport users (Surveillance systems, better street design)
- All Municipal Corporations will prepare and implement Parking Policy in their cities. It is also planned to have multi-level pay and park base multilevel parking complexes in all Municipal Corporations
- 10 cities under AMRUT cities will develop cycle track and footpath to promote Non- Motorised Transport (NMT). It is also planned to develop exclusive cycle track in Gurugram to guide other cities of Haryana.
- To reduce traffic congestion and to encourage people to use Public transport, on pilot basis Congestion Charge for some area will be introduced in Gurugram and Faridabad

Himachal Pradesh

Introduction

Himachal Pradesh (HP) is a unique state located in the north-western Himalayan ranges of India. The State is divided into 12 districts including 59 towns, 54 urban local bodies, 3,226 gram panchayats, and 20,690 villages. Shimla is the state capital. As per the 2001 Census of India, total population of Himachal Pradesh was 6.08 million which increased to 6.86 million in 2011, thus depicting a growth rate of 12.81 per cent in the decade. The population of Himachal Pradesh constitutes 0.57 per cent of the total population of India. Urban population accounts for 10.04 per cent of the total state population whereas the rural population of the state is 89.96 per cent.

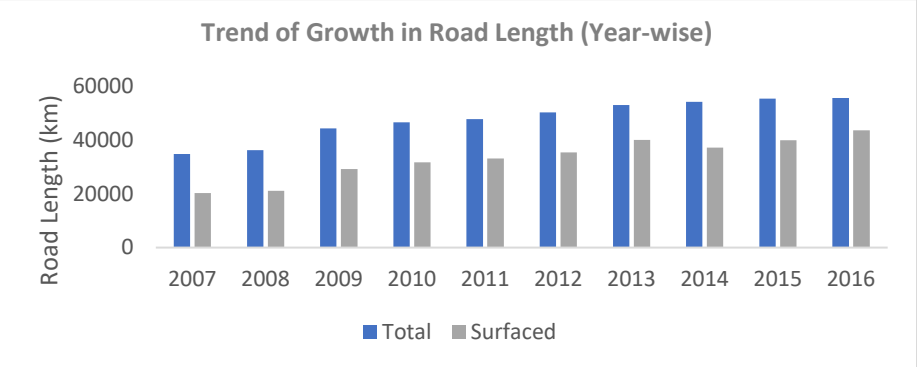
Tourism is the major economic driver in the state which contributes nearly 6.6 per cent to the State Domestic Product(Economic Survey of Himachal Pradesh, 2017-2018).The population density of the state is around 123 persons per square kilometre which is extremely low in comparison to the national average of 382 persons per square kilometre(Census of India, 2011).

Sector Overview: Transport

The transport sector plays a crucial role in the socio-economic development of a region. In order to devise a State Mobility Strategy Plan, it is important to understand the existing baseline transport scenario in the State and highlight the key trends with respect to passenger and freight mobility, emerging issues, and current and future transport strategies and initiatives that are already in place.

Road Network

The development of the road network has always been a key focus area of the state government in Himachal Pradesh, the total road length in 2007 was 34,954 kilometres, which increased to 55,759 kilometres in 2016 depicting an annual average growth rate of 7 per cent (Figure 1)(Basic Road Statistics of India, Ministry of Road Transport & Highways, 2015-16). The quality of road network improved significantly from 58 per cent of surfaced roads in 2007 to 78 per cent in 2016, which is higher than the national average value of 62.5 per cent. However, in terms of availability of roads per unit area, the road density in the State is only 0.62 kilometre per square kilometre of the area, which is much lower than the national average value of 1.7 kilometre per square kilometre of area.



Source: Basic Road Statistics of India (2015-16), Ministry of Road Transport & Highways

Figure 1Trend of Growth in Road Length in Himachal Pradesh

In Himachal Pradesh, 84 per cent of the total road network constitutes rural roads. The remaining road network consists of 5 per cent National Highways (NHs),) 3per cent Major District Roads (MDR), and 6per cent project roads. Urban roads contribute only 2 per cent of total road network length.

Rail Network

The state of Himachal Pradesh has a very limited rail network. The total route length of the operational railway network in the state is 242 kilometre. The narrow gauge network includes the 96 kilometre Kalka–Shimla line, a UNESCO World Heritage Site and the 113 kilometre Pathankot–Jogindernagar line. Apart from the narrow gauge, the state also has broad-gauge railway track of 33 kilometre, which connects Nangal Dam to Charuru. In terms of geographical coverage, the state has only 4.34 route kilometre of rail network per 1,000 square kilometres which is again lower than the national average of 20 route kilometre per 1,000 square kilometres.

Inland Waterways

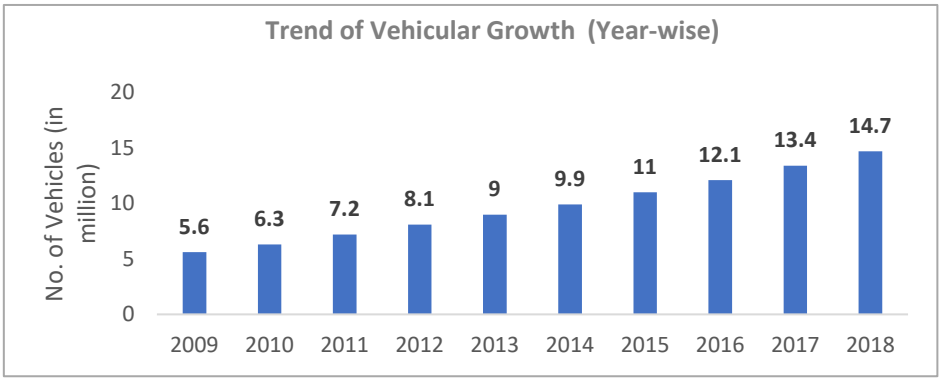
Water transport in the state is functioning at a very small scale. Currently, there are only four major water bodies in Himachal Pradesh which are being utilized for the purpose of water transport. These are Govind Sagar Lake in Bilaspur district, Kol dam in Mandi, Shimla & Bilaspur district, Pong lake in Kangra district, and Chamera lake in Chamba district.

Civil Aviation

Coverage of air transport in HP is currently negligible in the state. There are only three airports in the State located in Shimla, Kangra, and Bhuntar (Kullu-Manali). Apart from these airports, there are 63 operational helipads.

Vehicle Population and Growth

Over the past three decades, the growth rate of vehicle population in the state has shown a gradual and substantially increasing trend. The average annual growth rate increased from 2.7per cent during 1980-1985 and 7.8 per cent in 1995-2000, to 14.7 per cent in 2009-2018(State Transport Department, Himachal Pradesh, 2018). As seen in Figure 2, during the last decade, the number of vehicles has gone up from 5,64,636 registered motor vehicles as on 31st March 2009 to 1,47,45,94 on 31st March 2018.



Source: State Transport Department, Himachal Pradesh (2018)

Figure 2: Vehicular growth in Himachal Pradesh during (2009-2018)

Categorisation of Vehicle Population

Total vehicle population of the State stands at 15,06,271 as on 31.07.2018. Non transport vehicles account for 83.05% of total vehicular population. Personalised cars and two wheelers constitute 81.79% (Table 1) of total vehicle population whereas these vehicles accounts for 38.33% of passenger carrying share (Table 2).It impedes mobility on existing road network in town & cities. The problem gets compounded due to heavy tourist inflow (Table 3).

Table 1 Vehicle Classification

Total Vehicle Population	Transport		Non Transport	
15,06,271	2,55,519		12,50,752	
	Category of vehicle	% share in total population	Category of vehicle	% share in total population
	Goods (1,85,023)	12.28%	Two Wheeler (7,95,517)	52.81%
	Contract Carriage (40,435)	2.68%	Car (4,36,453)	28.98%
	Stage Carriage (6378)	0.42%	Agri. Tractor (6755)	0.45%
	PSV (22750)	1.51%	Construction Equipment (5694)	0.38%
	Others (933)	0.06%	Omni/PSV (6333)	0.42%
Total		16.95%		83.05%

Table 2 Passenger carrying share

Category	% age in Total Vehicle Population	Per Day Mobility of Passenger (in Lakhs)	Passenger Carrying share
Stage Carriage	0.42%	7.50	50%
Contract Carriage	2.68%	1.75	11.67%
Personalized Car & Two wheelers	81.79%	5.75	38.33%

Total	**84.89%**	**15.00**	**100%**

Source: State Transport Department, Himachal Pradesh (2018)

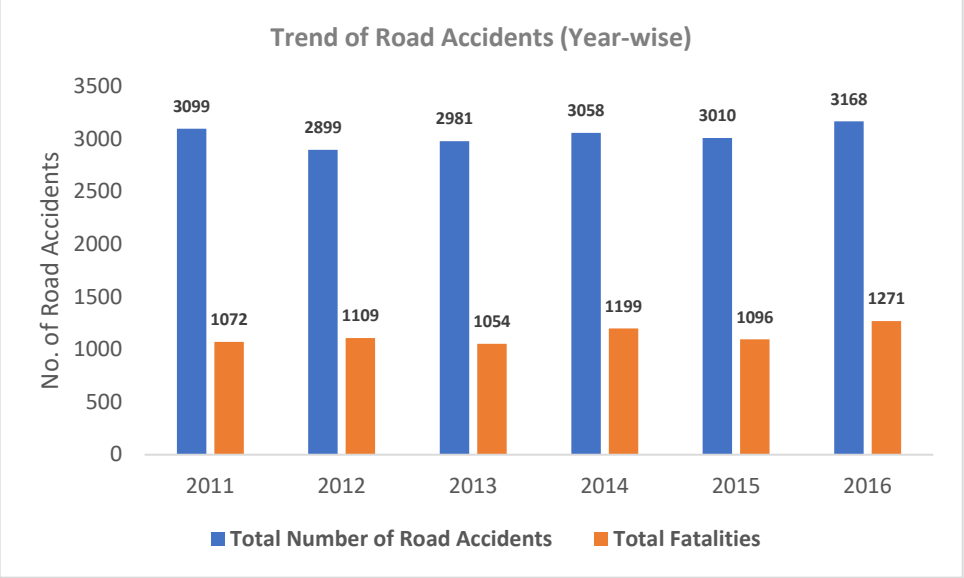
Table 3 Tourist inflow in the State

Year	Number of Tourists		Total
	Indians	Foreigners	
2015	1,71,25,045	4,06,108	1,75,31,153
2016	1,79,97,750	4,52,770	1,84,50,520
2017	1,91,30,541	4,70,992	1,96,01,533
2018 (upto March)	34,07,494	76,134	34,83,628

Source: State Tourism Department, Himachal Pradesh (2018)

Road safety

In 2016, the total number of road accidents reported in the state were 3,168, which is equivalent to 44.7 accidents per lakh population. This is higher than the national average of 37.9 accidents per lakh population. The total number of fatalities reported in 2016 were 17.9 per lakh population which is again higher than national average of 11.9 (Figure 3) (Road Accidents in India, Ministry of Road Transport & Highways, 2016).



Source: Road Accidents in India, Ministry of Road Transport & Highways (Various Years)

Figure 3: Trends in total number of accidents and fatalities in HP (2011-2016)

Public Transport

In Himachal Pradesh, the public transport system mainly comprises bus transport service offered by the state-owned road transport undertaking, Himachal Road Transport Corporation (HRTC) and the private operators plying their vehicles (including buses, taxis, etc.) under stage/contract carriage permits from the StateTransport Department. HRTC provides mobility services not only to the passengers within the state but also across state borders. At present, a total fleet of 6,378 buses operate on 6275 routes across the State. This includes 3,078 HRTC buses and 3,300 private buses (Himachal Road Transport Corporation, 2018). HRTC also operates intra-city buses in Shimla, Kullu, Dharmshala, and Manali Apart from this, there are 25 electric buses that ply on the Kullu-Manali-Rohtang Pass route under the HRTC.

Freight

The state of Himachal Pradesh has a significant freight movement which can be largely attributed to its horticulture and agriculture products. The growth of goods carrier vehicles in the state (including trucks, lorries, and light motor vehicles carrying goods) in 2009-2018 has shown an increase from 86,682 in 2009 to 1,65,454 in 2018(State Transport Department, Himachal Pradesh, 2018), that is an average annual growth rate of around 9 per cent. The State Transport Policy of Himachal Pradesh states that the freight segment in the state is characterized by proliferation of small operators with high operating costs. The cartelization of these operators results in rates and terms as per their choice. Also problem of overloading has associated ill effects in the form of accidents and damage to the roads.

Government Initiatives in Transport Sector

Transport for long has been high on the state government agenda. The Transport Policy 2014, launched by the State Department of Transport highlights the aim to develop transport infrastructure that makes mobility safe, comfortable, and affordable. The existing and future projects and investments planned in the various areas of the transport sector are discussed as follows:

Roadways

Improving Rural Connectivity

In Himachal Pradesh, road works of project value Rs. 5815 crore for a length of 18443 km, connecting 3,593 habitations have been sanctioned under the Pradhan Mantri Gramin Sadak Yojana (PMGSY) till date. Out of this, 13,744 km of roads to the tune of Rs 3,194 crore has been constructed till now (Himachal Pradesh Public Works Department, 2018).The State Government further plans to construct at least 200 km of new roads and take up upgradation of 800 km of road under the second phase of PMGSY(Himachal Pradesh Public Works Department, 2018). Rural Connectivity has also been improved through construction of roads/foothpaths/ropeways under MNREGA/different other schemes in the state.

Upgradation of Existing Roads

A total of 69 roads have been declared as National Highways with principle approval of Government of India in the State of Himachal Pradesh (Himachal Pradesh Public Works Department, 2018). These proposed National Highways will be instrumental in providing better connectivity with adjoining states, district headquarters, religious and tourist destinations, and small towns of the state. A proposal to the estimate of Rs 43,118 crores (which includes construction cost, land acquisition cost and utility shifting cost) has been made for the development of these identified roads.

Railways

There are a few proposals/projects (Ministry of Railways, 2018) in place with respect to extending the rail connectivity in the state of Himachal Pradesh which are at various stages of execution as listed below:

- Nangal Dam-Talwara (83.74 km) new broad-gauge line and taking over siding of Mukerian-Talwara (29.16 km)
- Chandigarh-Baddi-(27.4 km)
- Bhanupalli-Bilaspur-Beri-(63.1 km)
- Una-Hamirpur- (50 km)

Inland Water Transport

To integrate water bodies as a means of transport, the state government has conducted techno-economic feasibility study for development of jetties in Gobindsagar Reservoir, Koldam Reservoir and Chamera Dam Reservoir. Also the state intends to approach Inland Waterways Authority of India, to request for funding the proposed projects and to provide four 20 seater ferries to carry passengers & tourists on trial basis for Gobindsagar ,Koldam, and Chameradam. It is estimated that total cost of the proposed project will be to the tune of Rs. 26.1 crore.

3.4 Freight

The State Transport Department has proposed to establish eight Transport Nagars at Darlaghat, Hamirpur, Nagrota-Bagwan, Brotiwala, Gaggal, Barmana, Baddi, and Una in order to improve freight mobility in the state. The proposed Transport Nagars are envisaged to have state of art infrastructure with commercial facilities like -

- Truck Terminal Facility
- Public Amenities for Drivers
- Administrative Office
- Commercial Shops
- Repair Workshops & Garages

Public Transport

Provision of quality public transport services also attains utmost significance on the State Transport Agenda in HP. Providing additional electric buses and taxis for intra-city transport is being planned in a few main districts such as Kulluand Shimla. Apart from this, providing lifts and elevators for last mile connectivity is also an option that is being taken up by the State. Further, construction of bus stands in public-private partnership (PPP) mode has also recently caught attention of the State Corporation. A couple of bus stands have been and some others are being built on PPP model in the State.

Road Safety

Road safety is a major concern for the State Government. The safety concerns have been aggravated due to its hilly terrain and existing poor-quality and over aged fleet particularly in remote areas. Taking this into account, the state plans to direct efforts towards improving overall road safety in the state mainly with the installation of road safety infrastructure.

City Level Initiatives

Apart from the several national and state level initiatives in the transport sector, there are also city level initiatives in place that focus on promoting low carbon and sustainable mobility. National missions, such as AMRUT and Smart Cities, are some of the existing initiatives in place that focus on addressing mobility demands of cities. In Himachal Pradesh, Shimla and Dharamshala are covered under the Smart City Mission and Shimla and Kullu are covered under AMRUT.

SWOT Analysis

In order to formulate vision there should be evaluation of strength, weakness, opportunity and threats (SWOT) for the transport sector in state of Himachal Pradesh. A detailed SWOT analysis has been carried out and tabulated in Table 1 and Table 2 respectively.

Table 1 Strength and Weakness

Strength	Weakness
1. **Road Connectivity:** Road development sector has always been matter of utmost importance in the state due to the absence of any other viable modes. 78% roads are surfaced road (higher than the national average value of 62.5 percent). In terms of rural connectivity, around 97% gram panchayats are connected by motor able roads.	1. **Rail Connectivity:** Himachal Pradesh has a very limited rail network with only 242 kilometres of operational rail network in the state. The reason being unfavourable geographical conditions. 2. **Air Connectivity:** In terms of air connectivity, Himachal Pradesh has only three operational airports with limited flights plying to and from the state. 3. **Freight Transport Infrastructure:** Freight mobility in the State is found to be highly inefficient leading to higher costs and poor quality of service/monopolistic tendencies. 4. **Over dependency on Road Transport:** The increasing number of vehicles on road have exceeded the operating capacity of roads resulting in formation of bottlenecks and heavy congestion. This is largely due to heavy inflow of tourist population in the state over last decade. 5. **High Cost of Construction and maintenance of road network** In hills, construction of road involves cutting of upper slope side and construction of breast &retaining walls. Natural calamities like heavy snow fall, rains, & landslides, poor quality of roads and overloading of vehicles contribute to higher cost of repair and maintenance. 6. **Road side encroachments** There are enough laws to deal with road side encroachments. However, poor implementation of existing laws has led to mushrooming of unplanned, unauthorised road side constructions. The problem is so

Strength	Weakness
	alarming in congested cities and towns that widening of the roads has become a challenge for enforcement and executing agencies. 7. **Congestion** Personalised cars and two wheelers constitute 81.79% of total vehicle population whereas these vehicles account for 38.33% of passenger carrying share. This leads to congestion on existing road network as well as in town/cities. Congestion decreases mobility, accessibility and quality of life for the residents. It also hurts tourism, local business and service delivery. 8. **Unsustainable transport** Sustainability in transport sector implies finding a proper balance between social, economic and environmental qualities. ICT can help to achieve sustainability as it leads to better transparency, evaluation, decision making and monitoring.

Table 2 Opportunity and Threats

Opportunity	Threats
1. **Connecting Remote Habitations:** State government has been assigning very high priority to road sector. As of now, only 10,213 villages out of total 17,449 villages, that is 58.5% are connected by road. The government aims to connect all the remaining villages in a phased manner. 2. **Inland Water Transport:** The Central Government has notified four national waterways in Himachal Pradesh and attempts are being made to explore inland water transport in the state as waterways are more sustainable mode of transport. 3. **Alternative modes of Public Mass Transit:** State government has been exploring options of ropeways, cable cars, sky buses to shift existing load on road transport to overhead tracks (pod services, mono rail) and to provide connectivity to remote areas. Also inclusion of electric vehicles in public	1. **Natural Calamities:** In a hilly state like Himachal Pradesh, there is always a higher risk of natural occurrences like landslides, flooding etc. which cause hindrances in development activities. 2. **Deteriorating Air Quality:** The increasing number of vehicles (two wheelers and cars contributing to 81 per cent of total vehicular population)in the state has led to increased emissions resulting into Respirable Suspended Particulate Matter (RSPM) concentration of 78.8 micrograms/cubic meter which is higher than the national prescribed limit of 60 micrograms/cubic meter) 3. **Land Acquisition:** The state has forest cover an area of about 37,033 square km i.e. around 66.52% of the total area of the state. Land acquisition has been a critical hurdle in developing infrastructure especially in terms of connectivity because of protected forest lands, wild

Opportunity	Threats
transport fleet is being encouraged. Apart from this, heli-taxi services has also been initiated in the state from (Shimla-Chandigarh, Rohtang-Bhuntar) and these services will also be started to other parts of the state. 4. **Development of Urban Areas:** Several proposals have been made under central government's Smart City mission and AMRUT Schemes to develop state of art facilities in the cities like Shimla, Dharamshala, Kullu etc. 5. **Logistics Infrastructure:** Lack of logistic infrastructure in the State has resulted in inefficient freight movement. Hence, strategic planning is needed to develop efficient freight infrastructure facilities in the state. 6. **Promoting Electric Vehicle (EV) fleet:** Himachal Pradesh is a power surplus state. Ninety percent of the total power generation is contributed by renewable energy source i.e. hydropower. So, there is full potential to achieve a paradigm shift from existing petrol/diesel-based vehicles to electric vehicles.	life conservation and protest from local residents.

Vision

"To provide low carbon, eco-friendly, inclusive, safe, and reliable, integrated mobility solutions accessible to all, that plays a key role in fostering holistic development of the State"
To cater to the mobility needs of the state, which has been identified based on the key trends and issues, the above vision has been developed. To provide mobility solutions to Himachal Pradesh in conformity to the developed vision, **specific goals** have been formulated:

1. First/last mile connectivity to all and unconnected habitations;
2. Extend railway network to connect remote and inaccessible regions so as to ensure overall economic development;
3. To promote low carbon mobility solutions to minimize adverse environmental impact;
4. Develop Mass Rapid Transportation System and non-motorised transport (NMT);
5. To provide efficient, safe, reliable, and sustainable public transport solutions;
6. Develop connectivity to unexplored tourist destinations;
7. To provide rapid mobility on high density traffic routes;
8. To mainstream road safety concerns and introduce zero tolerance initiatives through institutional integration and regulations;
9. To introduce state of art freight vehicles and multi modal logistic hubs for efficient freight movement;
10. To identify the exact quantum of transport service required and routes to ply vehicles through ICT solutions;

11. Capacity Building (Establishment of Driving Training Centre, Inspection & Certification Centre etc.).

In order to achieve the above goals, it is important to devise strategies based on certain guiding principles. The section that follows proposes strategies towards achieving the formulated vision and goals.

Strategies

Considering the multiplicity of the issues a multiple-pronged approach has been proposed that is in line with the formulated vision and goals for the State. Table 3 provides an overview of the observed key issues, for which strategies have been proposed based on identified guiding principles.

To achieve the formulated vision and goals, strategies have been proposed under the following themes:

Table 6 Overview of recommended Strategies

Themes	Key Issues	Guiding Principles	Strategies	
			Short Term	Long Term
Road and network Infrastructure	1.Poor connectivity and accessibility 2.High dependency on existing road network and inadequate existing road capacity 3.Poor quality of road infrastructure	1.100% connectivity in the state 2.State-of-the-art road infrastructure	1. Improve the quality of existing road infrastructure 2. Safer & appropriate road design 3. Incorporate junction improvement plans 4. To set up one executing agency for development of MRTS 5. Development of bus stands on PPP mode 6. Expansion of existing airstrips/helipads 7. Inland water transport system 8. Improvement of NMT/pedestrian paths 9. Formulate policy to fund projects on tunnels, ropeways and other alternate mode of transport 10. Expedite preparation of DPR of NH and award of tenders	1. Widening & augmentation of the roads 2. Construction of tunnels 3. Alternative modes of transport for sustainable transport development such as railways, inland waterways, ropeways 4. Development of junction points 5. Construction of International Airport at Mandi 6. Night landing facility at airports

Themes	Key Issues	Guiding Principles	Strategies	
			Short Term	Long Term
			11. Proposal to GOI for changing the funding pattern of projects/schemes for hilly states	
Public transport	1.Inadequate Public Transport service	1.100% network coverage 2.High quality and reliable service 3.State of art bus depots, workshops and terminals 4.Clean fuel based public transport	**A. Shared Mobility** 1. Exploring different business models: Sharing cab/bike/auto-rickshaw/bi-cycles, Metered Taxi, Pre-paid taxi, Heli-Taxi, Electric Charging Stations etc. 2. Assess and identify the existing transport service options and service level gaps 3. Provide Shared mobility as a feeder service i.e. metered taxi/electric taxi for First/Last Mile connectivity 4. Improvement in frequency of buses 5. Incentivize by introducing seasonal passes for commuters 6. Harness on-demand services using App Based aggregators 7. Synchronisation of multi modal inter & intra state transport services at different places i.e. Kalka, Una, Kiratpur, Nangal, Chandigarh, Ambala etc. **B. Rural Mobility** 2. Identification of roads where either no service provided or are under served	**A. Shared Mobility** 1. Development of MRTS 2. Introduce Mobility as a Service (MaaS) using single booking across public transport 3. Ensure the reliability by providing integrated Passenger Information System and real time monitoring system 4. Universal Smart Card based fare collection system 5. App based Management and Information System **B. Rural Mobility** 1. Strengthening of State Transport Undertaking

Themes	Key Issues	Guiding Principles	Strategies	
			Short Term	Long Term
			3. Over all priority to public transport over personalized mode of transport to remote and difficult areas. 4. Providing last mile connectivity through small vehicles 5. ICT research based service determination system to identify gap for services 6. Route planning exercise using remote sensing to find unique area specific solutions	2. To promote scheme like Him Gramin Parivahan Swarojgar Yojna for rural transportation 3. Providing the state of art bus depots, terminals and workshops of STU 4. To promote mobility through waterways and composite ropeways (Passengers + Goods)
Air pollution (NMT & EV)	1.Depleting quality of air	1.Low carbon and sustainable modes of transport	1. Formulation of Electric Vehicle/Bio fuel Policy 2. Suitable tax and non-tax incentives to encourage environment friendly transport and provision of de-incentivise to polluting vehicles 3. Cater to differently abled citizens, senior citizens, school children etc. (Sub-ways, overhead bridges, Ramps etc.) 4. Providing electric buses and taxis in cities/towns. 5. Provide necessary infrastructure (Smart Grid, Charging Stations, Energy Storage solution) for promotion of clean fuel-based solutions	1. Provide pedestrian/Cycling zones to promote NMT 2. Introduce a state level scrapping programme to discard old polluting vehicles
Road safety	1.Rising road accidents	1. Zero tolerance initiative for road accidents	1. Redesigning of junction points and to incorporate overhead bridges, roundabouts, sub	1. Improvements of black spots 2. Strengthening State Transport Development & Road Safety

Themes	Key Issues	Guiding Principles	Strategies	
			Short Term	Long Term
			ways for safety measures 2. To ensure installation of traffic signage's Road Marks, Delineators, solar blinker etc. 3. To ensure Traffic regulating measures and minimizing noise pollution 4. Identification of black spots and installation of crash barriers 5. Training and refresher courses for skill development and behavioral changes for drivers and conductors 6. Strict enforcement of guidelines for safe transportation of school children 7. Real time Vehicle Tracking and Driver monitoring. 8. Stringent road passing norms 9. Review the constitution of Road Passing Committee at Sub Division Level 10. Road Safety Plan 11. Use of IP Cameras/CCTV for e-Challaning 12. Dedicated Control Rooms to monitor traffic	Council to oversee issues related to road safety 3. Inclusion of Road Safety modules in the State Education Curriculum 4. Improvement of road design for better comfort and safety 5. Automated Inspection & Certification Centres 6. Automated driving test tracks
Freight	1.Inefficient freight transport	1.State of art facility for freight	1. Introduce fuel efficient freight vehicle 2. Restricting monopolistic tendencies in transportation of goods	1. Extension of rail network. 2. State of Art Transport Nagar for Traffic Management & movement of goods carriages with intelligent transport system.

Themes	Key Issues	Guiding Principles	Strategies	
			Short Term	Long Term
				3. Promoting Zero/low emission vehicles for freight movement 4. Use of technology for seamless freight movement 5. To boost multi modal freight transport
Traffic Congestion	Parking and Traffic problems	Decongestion	1. Differential parking charges in and outside the towns/cities to discourage personalised transport 2. To regulate on street/road-side parking 3. ZERO tolerance towards road-side encroachments	1. Exclusive zones in congested cities/towns for public transport/NMT 2. To develop overhead transportation in Shimla, Dharamshala and Manali 3. Multi modal Integrated transport and parking for cities 4. Innovative (Hydraulic) smart parking solutions 5. Parking with proper lay ways and hassle free exit and entry lane

Roads

As providing connectivity forms an integral aspect of the goals and vision, it is imperative that the strategies focus on improving connectivity, especially in the remote areas. The strategies recommend to this end include the following:

Connecting remote habitations: Even though existing schemes are in place for improving connectivity in HP, habitations that are sparsely populated are left behind. This is due to the reason that habitations with a population less than 250 are not considered to be funded under the PMGSY or any other state and central schemes. To this end, the Himachal Pradesh Public Works Department (HPPWD) has identified 1,657 habitations (100–249 population) out of 4,074 habitations (population less than 250) to be connected by motor able roads, which would require an estimated fund of Rs 4,553.26 crores.

Construction of Tunnels: Further, with the vision to provide improved connectivity and reduce travel time, the State government feels the strong need to construct tunnels to help in connecting the remote areas which remain cut off during winter. Following is the list of tunnels proposed by State (Table 6).

Table 7List of proposed traffic tunnels in the state of Himachal Pradesh

S. No.	Name of Proposed Tunnel	Length in km	Cost in Crore
1	Bangana to Dhaneta Tunnel	1.265	225
2	Bhubujot Tunnel	3.161	860
3	HoliUtrala Tunnel	6.905	1560
4	Chamunda-Holi Tunnel	14.5	2430
5	Tissa-Killar under Channi Pass	13	2230
6	Jalori Pass Tunnel(Khanag(Bhjara mod) to Hirabsajwad)	4.2	1060
7	Bhaba valley to Pin valley tunnel(Kara to Terrey Khago)	12.5	2150
	Total		**10515**

Upgradation of Roads: Additionally, Public Works Department of Himachal Pradesh also proposes to upgrade 87 Major District Roads in the State to Intermediate Roads with an estimated cost of Rs. 6,503 crore.

Public Transport

Public transport being an indispensable element for catering to the mobility needs of the state, the proposed strategies focus on improving the existing public bus services and other intermediate public transport modes, such as taxis and mini buses. The HRTC is currently running a bus fleet of 3,000 vehicles in the state, along with 3300 private buses, however, the current public transport is inadequate to meet the state mobility demand. The state aims to provide quality, safe, affordable, clean, and reliable public transport. The strategies proposed for improving public transport are enumerated as follows:

- Increasing the share of public buses in stage carriage operation in alignment with transport policy
- Increase the network coverage and frequency of buses in the state
- Regular inspection and maintenance of the bus fleet
- Promotion of clean fuel-based electric buses
- Providing last mile connectivity through electric and metered taxis
- Ensuring reliability of buses through Intelligent Transport Systems(ITS)-based real time monitoring and passenger information system
- Upgrading the bus stops, terminal, workshops and depots with charging infrastructure for the electric buses in the fleet.
- Route rationalization for improving public transport services
- Identification of road where either no service provided or underserved
- Overall priority to public transport over personalised mode of transport by giving priority to remote and difficult areas.
- To promote schemes for rural transport

Apart from these strategies, it has also been proposed that alternative modes of public transport, such as ropeways, heli-taxis, sky buses, and pod services should be assessed as an option to meet out the growing mobility demand.With an objective of decongesting roads in cities such as Shimla, Mandi, Dharamshala, and Manali, a combination of overhead transport system which includes mass transit through ropeways and cable cars is proposed. This system will take off considerable load from

existing roads especially in above mentioned cities. The following traffic routes have been identified where connectivity can be provided through passenger ropeways or cable cars, such as the following:

- Parwanoo to Shimla
- Dharamsala to Kangra and Palampur
- Bhunter to Manali

Apart from these, there are several tourist locations where possibility of mass transit through ropeways or cable cars can be explored by conducting feasibility studies such as the following:

- Tirthan valley in Kullu
- Seraj Valley in Mandi
- Pabber valley in Rohroo
- Sarahan in Rampur
- Sangla in Kinnaur
- Dhauladhar valley in Kangra
- Rajgarh in Sirmour

Also, at the state level, there are 433 habitations (with population of more than 250) that are still not connected due to either non-availability of land or the need for forest clearances. These habitations can be potential sites for deploying ropeway projects. To this end, a proposal to of an estimated value of Rs 2,160 crore has also been proposed.

Air Pollution

Air pollution is an emerging concern in Himachal Pradesh. The state annual average Respirable Suspended Particulate Matter (RSPM) concentration is 78.8 micrograms/cubic meter which is higher than the national prescribed limit of 60 micrograms/cubic meter. The key reason can be attributed to the vehicular growth of 14.7 per cent which is higher than the national average growth. Similar trends have been observed in growth of personalized motor vehicles. Given the rising concerns of deteriorating air quality and rising pollution levels in the urban centres, it is important to promote the use of cleaner fuels in the long run. To address the issue of deteriorating air quality due to transport in urban areas, adoption of electric vehicles is proposed. Especially since the state is energy surplus and 90 percent of the power generation is from hydropower, electric vehicles prove to be a good alternative. Apart from this, the following strategies have been proposed:

- Introduce a state level scrapping programme to discard old polluting vehicles.
- Introduce taxes to de-incentivize the use of emission intensive vehicles, along with incentivizing the use of clean fuel vehicles, that is, electric vehicles
- Develop required infrastructure for achieving a shift to cleaner fuels.
- Develop air quality improvement plans for cities (introduction of no emission zones or pedestrianized zones).
- Develop city mobility plans with public transport (PT) and non-motorized transport (NMT) as important components and also keeping tourist demands in mind.

- Provide adequate and appropriate PT systems.
- Air quality checks through adoption of a robust inspection &maintenance regime.

Road safety

In terms of severity of road accidents (persons killed per 100 accidents), in 2016, HP has 40.1 causalities per 100 accidents, which is higher than the national average of 31.4. The Government of Himachal Pradesh has recognized the importance of road safety and envisages its mainstreaming by undertaking all tangible actions for 'Zero Tolerance' by strengthening the regulatory regime for road safety. It is proposed that the 4 Es of road safety be adopted, enumerated as follows:

Engineering: Provision of safer roads, improving road signages, adopting junction improvement plan, rectification of identified black spots, providing traffic calming measures, such as crash barriers, cheveron markers, retroreflective markings, blind curve mirrors, etc.

Enforcement: Strengthening regulatory regime of the state by constituting a road safety agency, improving enforcement and patrolling through vehicle-mounted GPS, introducing camera, speed guns, etc., for monitoring, restricting the movement of overloaded vehicles, effective vehicle management through inspection & certification centres and driving training institutes and implementing strict enforcement for traffic violators.

Education: Education and awareness programmes to enlighten users on the traffic rules, mandatory driver training programme, and mandatory inclusion of road safety modules in the state education curriculum.

Emergency services: Improving emergency care services for post-accident response in the State.

As rural roads constitute nearly 80 per cent of the total road network length in the State, it is proposed that road safety measures be integrated in rural roads as well. Also, based on an analysis put forward by the HPPWD, maximum fatalities occur due to run off accidents on rural roads. Therefore, road safety measures integrating road safety on rural roads have been proposed (Table 7).

Table 7 Cost requirements for various Road Safety Measures

S. No.	Road Safety Item	Funds Required (in Rs. Crore)
1	Provision of Crash Barriers	925
2	Improvement of blind curves by formation cutting &construction of retaining structures	8886
3	Signages	101
4	Road Safety Audit of Existing Roads	26
Total		**9939**

Source: Public Works Department, Himachal Pradesh (2018)

Freight

To improve the quality of freight services in Himachal Pradesh, it is proposed to develop a state as well as city-specific freight mobility plan which prescribe the introduction of ‘Transport Nagar’, multi modal logistic hubs and improvement of vehicle efficiency of the existing freight. It is also proposed that state-of-the-art infrastructure facilities be provided, usage of fuel efficient vehicles be ensured, and over loading be restrained, in order to improve the quality of freight transport. Further to reduce the burden on road infrastructure, the augmentation of rail network is also proposed for freight movement.

To effectively implement the above strategies, the state plans to focus on developing a robust institutional framework and strengthening existing institutions and mobilizing sufficient funds. The institutional reforms will not aim to reorganize the existing institutional setup in the State, but will look at developing a more robust policy monitoring mechanism for effective implementation of the strategies and ensuring more coordinated development of the transport sector in the state in line with the envisaged vision.

Jharkhand

Introduction to the state

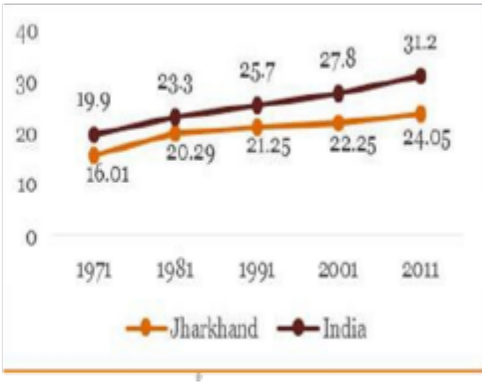
Jharkhand– Economic Statistics

- Population of Jharkhand[1]- 32988134 (32.99 Mn)
- % of Rural Population- 76[1]
- No. Of Districts- 24
- Per Capita Income- Rs 54140 as on 2015-16

Jharkhand– Transport Statistics

- No. of motorized vehicles in the State- 5145735
- Share of two- wheelers- 76.04%
- Share of Cars- 10.23%
- Share of Buses and Autos- 3.17%

Trend of Urban Population (% of total Population)



Source: [1]Census 2011
[2]Jharkhand Economic Survey-2017
[3]https://parivahan.gov.in/vahan4dashboard/
Jharkhand Economic Survey 2016-17

Number of vehicles Category wise

S.No.	Financial Year	Truck/Mini Truck	Bus/M.W. Bus	Car/Station Wagon	Taxi	Jeep	Three Wheeler	Two Wheeler	Tractor	Trailor	Other	Total
	Upto 2001	58069	8079	69205	16863	18402	28981	688816	8525	7431	4630	909001
1	2001-02	1171	221	6442	1433	1454	1771	60491	1688	1358	249	76278
2	2002-03	1413	788	7690	2269	1990	2462	97524	1955	1660	737	118488
3	2003-04	1649	379	9761	1465	1849	2523	92937	2573	2044	791	115971
4	2004-05	3096	339	10005	1475	3354	4457	111947	2919	2244	555	140391
5	2005-06	4169	478	11983	1623	4546	6226	128332	3368	2377	961	164063
6	2006-07	5161	576	12713	1464	5060	7041	140689	3480	2386	1195	179765
7	2007-08	5688	463	12849	1488	4107	5583	125967	2808	1946	1487	162386
8	2008-09	6496	412	15747	2581	5180	6901	141090	3889	2729	1842	186867
9	2009-10	7217	557	19517	3012	6700	9396	167991	4766	3479	2634	225269
10	2010-11	6325	593	26949	2543	7737	9876	209006	5685	4361	3483	276558
11	2011-12	7512	676	24525	2679	6760	11387	212928	5458	4158	3495	279578
12	2012-13	7134	788	24882	4083	8429	12264	224440	6560	4843	4738	298161
13	2013-14	6128	641	23221	3801	8091	14197	243849	7711	5713	5436	318788
14	2014-15	6343	439	27862	2605	7025	14800	271741	8343	5509	5465	350132
15	2015-16	6942	643	31130	2616	7355	13913	323027	8671	5592	3937	403826
16	2016-17	7724	738	34233	2098	6575	14982	346847	8121	5188	4180	430686
17	2017-18	15463	934	45080	3833	2077	23711	392072	15290	7541	3526	509527
Total		157700	17744	413794	57931	106691	190471	3979694	101810	70559	49341	5145735

Vision and Objectives

To achieve Sustainable, Cost effective, User Friendly, Clean, Inclusive, Safe and Seamless Mobility, which will be People Centric rather than Vehicle Centric and will emphasize on public transport systems, non-motorized transport including cycling & pedestrian facilities and adopt disruptive technologies such as electric vehicles, shared mobility, digital-enabled mobility, etc. that promote employment opportunities and economic growth for the State.

Objectives

- Mobility of passengers and goods through integrated approach by various transport modes such as road, rail, air and in-land waterways and non-motorized transport systems

- Development of road infrastructure that enable faster, safe and seamless mobility of passengers and freight
- Development of bus connectivity across the state down to rural areas
- Development of railways in cooperation with the Ministry of Railways, Government of India for passenger and freight mobility
- Development of air travel in cooperation with the Ministry of Civil Aviation, Government of India for passenger mobility down to smaller cities
- Leveraging Inland waterways developed by the Inland Waterways Authority of India (IWAI) to the economic development of Jharkhand
- Improving urban transport with public transport, shared mobility, electric vehicles, non-motorized transport such as cycling and walking

Rural Road Network (Existing)

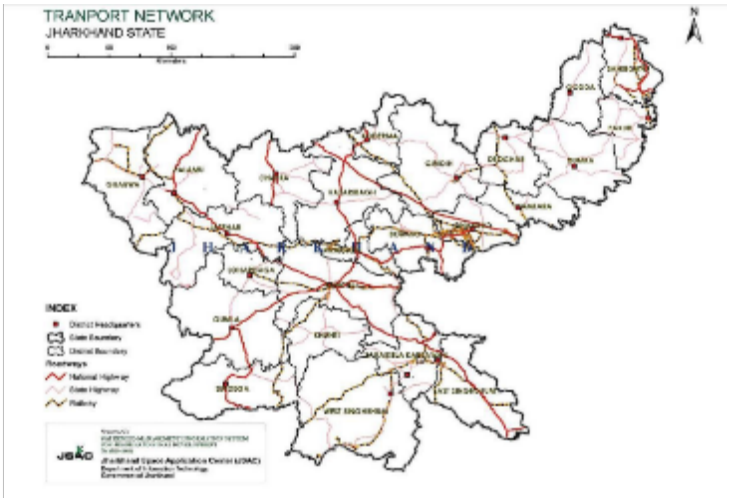
- The rural road density in Jharkhand is 516 km per1000 square km, while the national average stands at 806.6 km per 1000 square km.
- Up till the Financial year 2017-18 25200 out of 36827 villages in Jharkhand have been connected by all-weather roads
- In 2016-17, the state constructed 2054 km of rural roads through its own schemes and 1370km of rural roads through centrally sponsored schemes.
- In financial year 2017-18, the state completed 2500km of rural roads against a target of 5000km

State Sponsored Scheme			
Year	Length of roads		
	Target (Without spillover)	Completed	In Per cent
2011-12	1200	860	71.6
2012-13	1500	1326	88.4
2013-14	1500	1042	69.5
2014-15	1500	1311	87.4
2015-16	1500	2051	136.7
Central Sponsored Scheme			
Year	Length of roads		
	Target (Without spillover)	Completed	In Per cent
2011-12	2000	1123	56.15
2012-13	2000	1242	62.1
2013-14	2000	1007	50.35
2014-15	2000	1748	87.4
2015-16	1340	1370	102.22

Urban Road Network (Existing)

No. of National Highways (NHs)	2649 km
Total Length of RCD roads	11533 km
Breakup	SH: 1231.9 km, MDR: 4845.7 km, others: 5455 km
NH with State Govt.	1842 km
NHs transferred to NHAI	807 km

Category of roads	Approx. length (in km)
State highways	1231.90
Major district roads	4845.70
Other district roads	5455.00



Jharkhand has an average urban road density of 3.05 kilometres of pucca road per square

Rail Network in Jharkhand (Overview)

As on 2017 the total broad gauge network in the State is 2855 km

Railway Line Name & Km	Status
Deoghar-Dumka (60km)	Started
Dumka-Rampurhat (64km)	Started
Ranchi-Lohardaga-Tori (113km)	Started
Ranchi-Barkakana-Hazaribagh-Koderma (203 km)	Barkakana-Hazaribagh-Koderma (137km) started Barkakana- Ranchi (63.34km) is likely to be completed by march 2019
Koderma-Giridih (111km)	Koderma-Nawadih-Kawar (88km) train service has started and Kawar-Giridih (23km) is likely to be completed by march 2019
Koderma-Tilaiya (14km)	5km track has been laid down rest to be completed by March 2019
Godda Hansdiha new BG Line (34.464km)	MoU has been signed between MoR and GoJ
Pirpainti-Jasidih (97.17km)	MoU has been signed between MoR and GoJ
Tori-Shivpur rail line (44km)	Land has been transferred and project to be completed by 2019

Air Connectivity

- *Govt. of Jharkhand has signed a tripartite MoU on 25.03.2017 with DRDO and AAI for development of Deoghar airport in Deoghar district of Jharkhand*
- *The runway at Giridih airport is being strengthened along with the construction of Hanger, Boundary wall and VIP lounge*
- *The runway at Palamu airport is being strengthened along with the construction of Boundary wall*
- *Starting scheduled airlines services under RCS from important cities such as Bokaro, Dhanbad, Dumka and Daltonganj*
- *Development of Birsa Munda Airport, Ranchi up to international standard*
- *Development of helipads at tourist places- Rajrappa, Netarhat, Itkhori, Parasnath, Basukinath, Maluti and Shivgadidham*
- *Development of domestic airports near Jamshedpur and Dhanbad. The sites have been identified at Dhalbhumgarh near Jamshedpur and Baliapur near Dhanbad*

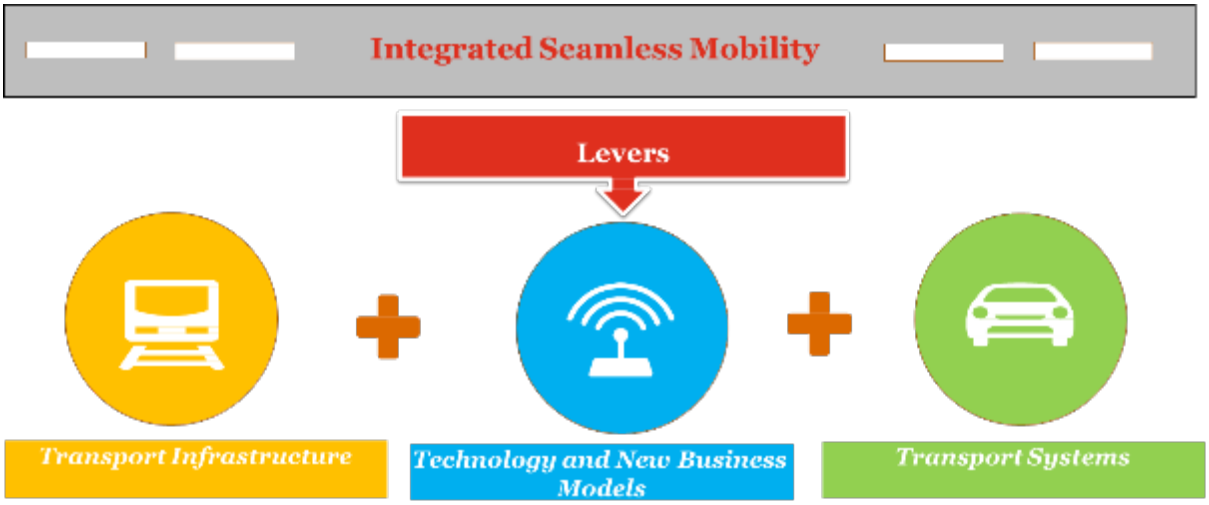
SWOT Analysis

Strengths	Weaknesses
• Urbanization • Increasing Economic Growth and rising purchasing power. GSDP 12.5 % against national average of 7% in 2015-16 • Increase in non-motorized transport such as Cycles and unstructured public transport like e- Rickshaws, autos etc. • Leveraging the benefits/expertise of Ranchi Smart City Mission • Enabling policies for incentivizing plying of buses in Rural Areas • Economic/Industrial Corridors in the State like Jamshedpur and Dhanbad • Utilization of existing water corridors	• The absence of Public Transport has led to proliferation of personal vehicles • The Road network needs development and augmentation • The sufficient Right of Ways for transport planning is not existing • Disturbance due to left wing extremism (19 districts as per Home Dept., Govt. of Jharkhand) • Disbursed settlement of population • Absence of inclusive mobility (no disabled friendly infrastructure) • Unstructured monitoring and control of fares of stage carriage, autos etc.

Opportunities	Threats
• Sufficient precedence of Mobility Solutions across the country such as Delhi Metro, Ahmedabad BRTS, Public Bicycle Sharing (PBS) at Pune, etc. • Delivery mechanism of profit making and successful SRTUs such as Karnataka can be studied for emulation. • The Regional Connectivity scheme will boast • connectivity of prominent places in the State • Increased Rail Network in the State (from 2536 km in 2014 to 2855km broad-gauge in 2017) • Setting up and operationalizing a Unified Metropolitan Transport Authority (UMTA) • Inorganic growth of application based cab aggregators • Non-existence of any Integrated Mobility Plan, transport infrastructure and hence possibility for the state to adopt latest technologies	• Demand elasticity concerns for Mobility Planning. • Long gestation period • Existing unstructured operations by private players who may be resistant to change • Dominance of auto, bus unions. • Lack of common multi-sectoral vision for enhanced transport connectivity and coordination between all nodal departments (Transport, RCD, Home, Rural Development)

Strategic Levers for Transformative Mobility:

The three levers of Integrated Seamless Mobility



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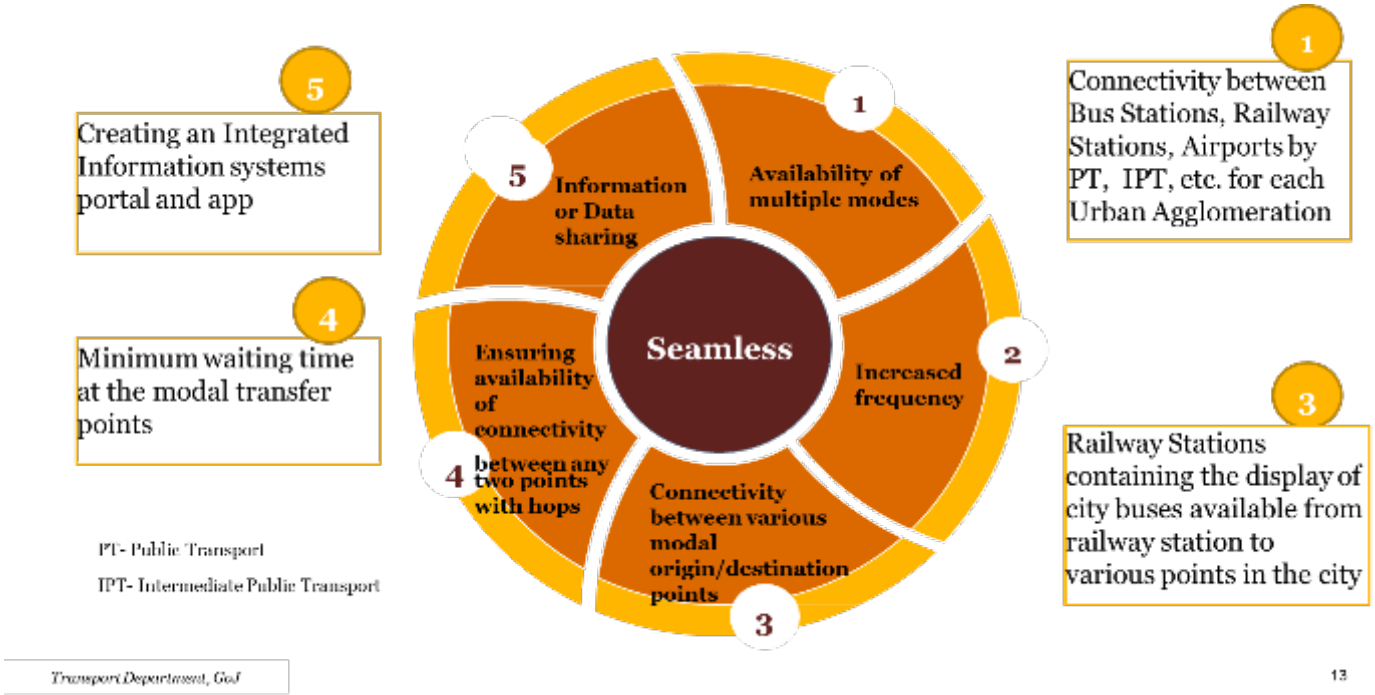
Jharkhand's mobility will focus on Integrated Seamless Mobility Strategy



Transport Department, GoJ

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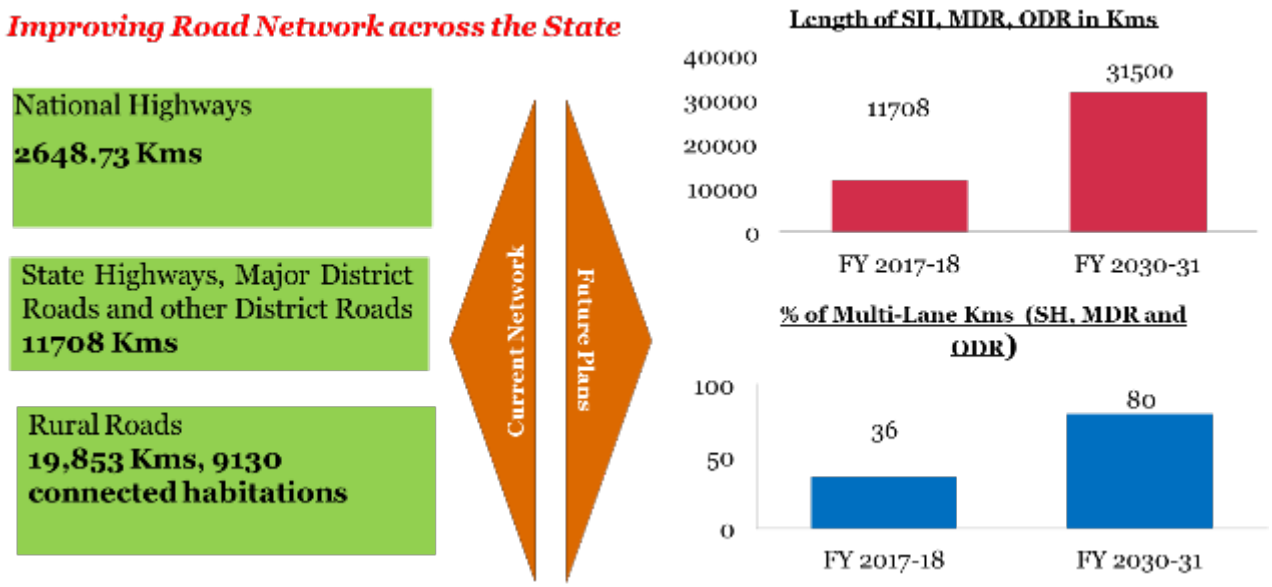
Expanding/Enhancing the network infrastructure for various modes(Road, Rail, Air, Waterways)

Transport Infrastructure - Road Network



Strategy to Accelerate Road Construction

- *The Road Construction Department will conduct a study of the existing road network to identify the Core Road Network(CRN), which will help in prioritization/schedule phase-wise development of the CRN.*
- *To address the funding requirements, Government will strengthen State Highways Authority of Jharkhand (SHAJ) to leverage alternate sources of funds and use innovative asset management models such as BOT, TOT, HAM, etc.*

Transport Systems - Intra and Inter State Buses

Jharkhand State Road Transport

Although Jharkhand does not have a State Run Transport Corporation, Govt. encourages the Private Bus Transport

Promoting Comfortable Travel

The Govt. has brought paradigm shift in Bus services in 2014 by introducing Permits for 90 AC Buses for connecting various District HQs. to State Capital and between two District HGs.

Rural and Inter-State Bus Connectivity

Govt. has also focused on Rural routes. In the last three years, permits for 174 rural buses were issued. Inter-States agreements are executed with neighboring States

In total, Jharkhand Govt. gave permits[5] for 1737 for Intra-state and 1092 for inter- state buses between 2014-15 and 2017-18.

From/To													
Ranchi	Jamshedpur	Hazaribag	Giridih	Dhanbad	Chaibasa	Modinagar	Garhwa	Gumia	Simdhega	Koderma	Dumka	Deogarh	No. of AC Buses
	27	19	12	6	4	3	6	1	2	4	2	1	87
Dhanbad		3											3
Total													90

Benefits under Rural Connectivity Scheme for Bus Operators

- 364 routes notified
- Incentives under Stand-up India to entrepreneurs opting for bank financing
- Road Tax completely waived off for Buses opting for notified rural routes
- Permit Fee at Re 1

<u>Strategy for Increasing Bus Connectivity</u>

- ***Jharkhand has around 3000 buses operating in the State. The no. of buses per million population for Jharkhand is 78, whereas India's average is around 350***
- ***Govt. has engaged a consultant to suggest mechanism to improve the overall Bus Connectivity in the State. The consultant already initiated the work..***

[5] Data from Transport Department

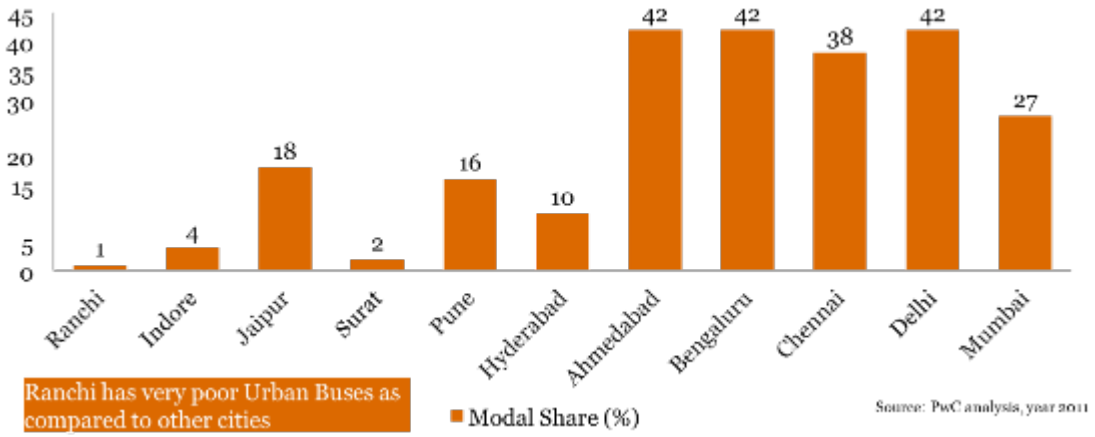
State wide Bus Connectivity: Jharkhand Government is evaluating the gap in the bus connectivity in the following layers:

1) Connectivity between all urban agglomerates
2) Connectivity between state capital and district HQs
3) Connectivity between adjacent district HQs
4) Connectivity of all blocks to their district HQs
5) Connectivity to villages from their respective block HQs
6) Connectivity to important tourist destinations

Strategy for Improving Bus Connectivity

- To address the man-power shortage for heavy motor vehicles, Government will open Driver Training Institutes in all Districts
- Streamline the inter-state agreements. No agreements with Uttar Pradesh as of now.
- Streamline the National Permit process
- Permit for private buses to be made easier through robust IT systems

Transport Systems - Urban Buses



- At present, public transport with JNNURM buses – 70 each in Ranchi and Jamshedpur and 50 in Dhanbad
- Eight routes have been identified by Ranchi Municipal Corporation (RMC) to operate its city buses. Two routes are operational as of now.
- Comprehensive Mobility Plans (CMP) prepared for six Urban Agglomerations (UA) - Ranchi, Dhanbad, Chas, Chaibasa, Phusrao and UA of Jamshedpur, Adityapur, Mango & Jugsalai

Transport Infrastructure - Rail

Present Scenario

Existing Total Route Kms[1]
2394.46
Rail Density- 30.038 Kms/1000 Sq Kms
National Average- 20.29 Kms/1000 Sq Km

All Districts Except Chatra and Gumla have Railway Network

Source[1]: Press Information Bureau (as on 31 March 2016)

Ongoing Projects

Extending Rail Networks to the Hinterland

Ranchi-Barkakana-Hazaribagh-Koderma (203) Kms
- Koderma-Hazaribagh-Barkakana (137 Kms) completed, Barkana-Ranchi (63.3 Kms) likely to be completed by March 2019

Koderma-Giridih (111 Kms)
- Koderma-Nawadih –Kawar (88 Kms) completed, Kawar-Giridih (23 Kms) likely to be completed by March 2019

Koderma-Tilaiya (14 Kms)
- likely to be completed by March 2019

Godda- Hansdiha New BG Line (32.464 Kms)
- Likely to be completed by March 2020

Pirpainti-Jasidih (97.17 Kms)
- Likely to be completed by March 2022

New Projects
- Namkum-Kandra (Adityapur
- Giridih Parasnath-Madhuban
- Tori-Katra
- Tori-Shivpur

Strategy

Jharkhand Rail Infrastructure Development Corporation Limited shall facilitate the following

1. Identification of tourist places and developing rail infrastructure along the route Eg. Ranchi – Tori – Scenic beauty – Premium trains will be run by IR – Tourism Development
2. Developing rail infrastructure along Pilgrimage Circuit – Shakthi Peeths - Tourism Development
3. Doubling/Tripling of sections where Capacity Utilisation exceeds 100%
4. Electrification of routes where none
5. Extending lines to reach mineral spots

To make these projects commercial viable, Jharkhand will bear the cost of land and share 50% of the Construction Cost

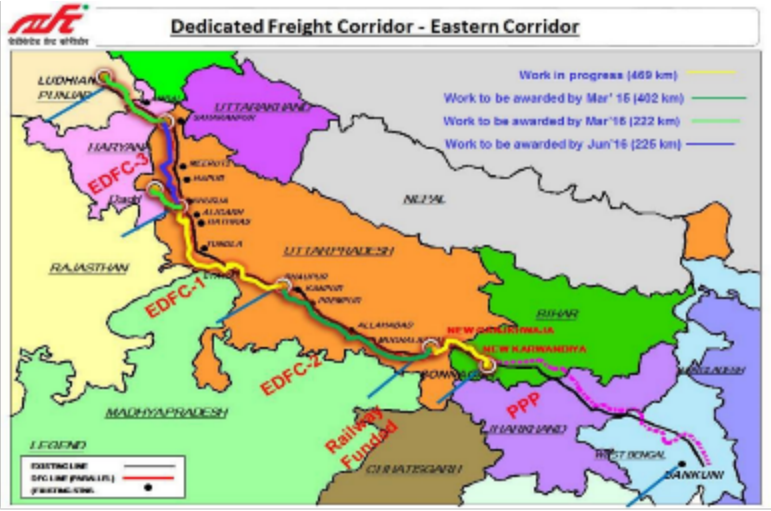
- *Tripartite MOU has been signed among Central Coalfields Limited (CCL), IRCON & GOJ with equity share 66:24:10 respectively for connectivity in coalfield /mining areas.*
- *A new rail line Shivpur-Kathautiya is proposed to be taken under JCRL. Further new rail lines connecting coalfield and mining areas to be taken up by this company.*

Transport Infrastructure- Eastern Dedicated Freight Corridor

196 Kms of Eastern Dedicated Freight Corridor Passing through Jharkhand

The Eastern Corridor will be immensely beneficial to the Industries of the State

Jharkhand Rail Infrastructure Development Corporation will strengthen connectivity between EDFC and the State hinterlands



Transport Infrastructure -Inland Waterways

1 Inland Waterways I

Between Allahabad and Haldia, 18 terminals in between. Sahibgunj in Jharkhand to be developed at multi-modal port

2 Connectivity to Sahibgunj

Better roads and rail network to Sahibgunj from industrial and mineral dominant areas would be immense value add for State's economy

3 Other Two Rivers

Damodar, Kherkai and Subarnarekh are identified for Inland water transport. The potential for transportation through these rivers are not yet fully assessed

Freight Mobility

The Inland Waterways is developed especially for Cargo

Inland Waterways (Sahibganj MMP)

Present Scenario

- Jal Marg Vikas Project (JMVP) of National Waterways I between Varanasi and Haldia (1390 Kms)
- Sahibganj is developed as a Multi-Modal Port
- Likely to be operational by April 2019
- Coal Shipment of around 8.12 MT between Sahibganj and Varanasi forecasted by 2025
- Land allocated for ship repair facility
- 250 acres of logistic hub planned

Strategy

- Better roads and rail network to Sahibganj from industrial and mineral dominant areas will be developed
- Passenger terminal will also be proposed in National Waterways I for Jharkhand
- Damodar, Kherkai and Subarnarekh are identified for Inland water transport. The potential for transportation will be leveraged after the proper assessment

Transport Infrastructure – Aviation

Present Scenario

- 12 Aerodromes in the State
- Three Airports developed for Regional Connectivity Scheme (RCS)
- Jamshedpur- Sonari Airport, Runway length 3921 ft (R/W-08) and 4350 Fts (R/W-26), Operated by Tata Steel.
- Dumka- Runway Length 4000 fts, extendable up to 9500 ft towards east.
- Bokaro- Runway Lenth 5314 fts, extendable to 6000 fts. Maintained by SAIL
- The Ranchi airport has handled > 1 million passengers in 2016-17.

Routes awarded under UDAN Scheme as on March 2018

- Jamshedpur Kolkata- Deccan Charters
- Ranchi Jharsududa - Air Odisha
- Bokaro Kolkata - Spicejet
- Bokaro Patna - Air operator To be decided
- Dumka Kolkata- Air operator To be decided
- Dumka Ranchi - Air operator To be decided
- Ranchi Dumka - Air operator To be decided

Deogarh Domestic Airport

- JV between the AAI and the Jharkhand State Government
- Will be equipped to accommodate A320 aircraft
- Peak hour handling capacity for 200 passengers
- Likely Completion: December 2019

Benefits provided by Jharkhand Government for UDAN Scheme

1. State Government will reduce VAT to 1% or less on ATF at RCS airports and RCS flights from other airports within the state for 10 years
2. State Government shall provide land free of cost and encumbrance for development and expansion of RCS airports
3. State Government to provide multi modal hinterland connectivity (road, rail, metro waterways etc)
4. State Government to provide security and fire services free of cost at RCS airports

5. State Government to ensure provision of electricity, water and other utility services at substantially concessional rates at RCS airports

Strategy for Improving Air Connectivity

Extension of UDAN Airports

- Medinipur- Chiyanki Airport, Daltonganj. Runway length to be extended from 3000 ft to 5200 ft.
- Hazaribagh- Existing runway length to 2422 ft, can be extended up to 9000 ft

Feasibility for Air Cargo Hub

- Baharagora in East Singhbhum district

Expansion of Ranchi Airport

- Ranchi Airport is likely to cater around 1.9 Mn passengers by 2019. Feasibility studies is planned to upgrade Ranchi to International Airport
-

Jharkhand government will leverage UDAN Scheme to commence commercial air operations in the remaining aerodromes, after due diligence on the passenger demand estimation and financial viability. To make Udan Airports viable, non-box fare collections such as creating Gliding schools shall be implemented.

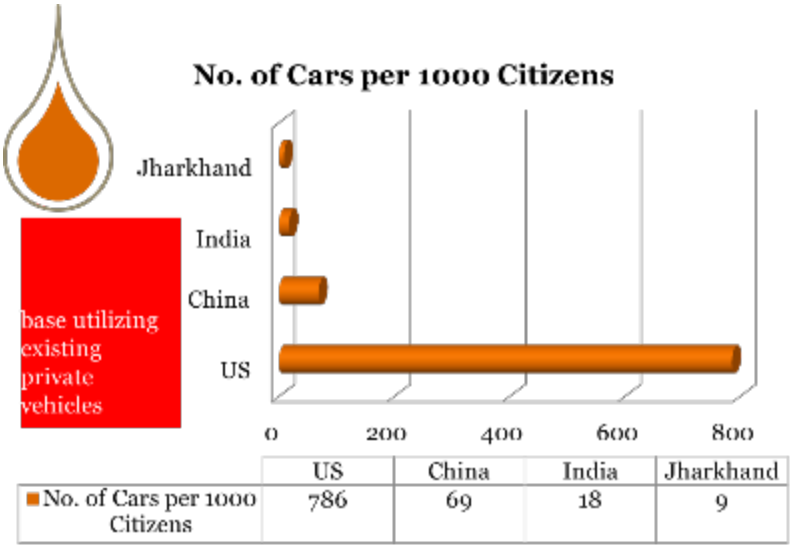
Shared Mobility

New Business Model - Shared Mobility

Numerous Offerings and Business Models Constitute Shared Mobility

1 **Intermediary services:** Lie outside the range of public transportation agencies and typically travel flexible routes based on demand. Three wheelers, a popular form of intermediary services.
2 ***Pooled Ride Hailing Services:*** Ride-hailing services are data- enabled mobility services that allow travelers to hail private, point-to- point rides on an as-needed basis s and evolving routes such as Uber, Ola, etc..
3 **Vehicle sharing:** Vehicle sharing is an alternative to private-vehicle ownership such as ZoomCar**.**
4 ***Peer to Peer Vehicle Sharing:*** Consumers are able to rent vehicles from their neighbors or peers. Such as Wunder, etc. This model of sharing could increase privately owned vehicles' asset utilization rates.

New Business Model - Peer to Peer Vehicle Sharing



	US	China	India	Jharkhand
No. of Cars per 1000 Citizens	786	69	18	9

Economic Times- 25 July 2018

The government is considering the Singapore model under which a private car owner can provide two shared rides a day

Source: PwC Analysis, NITI Aayog Report: India Leaps Ahead

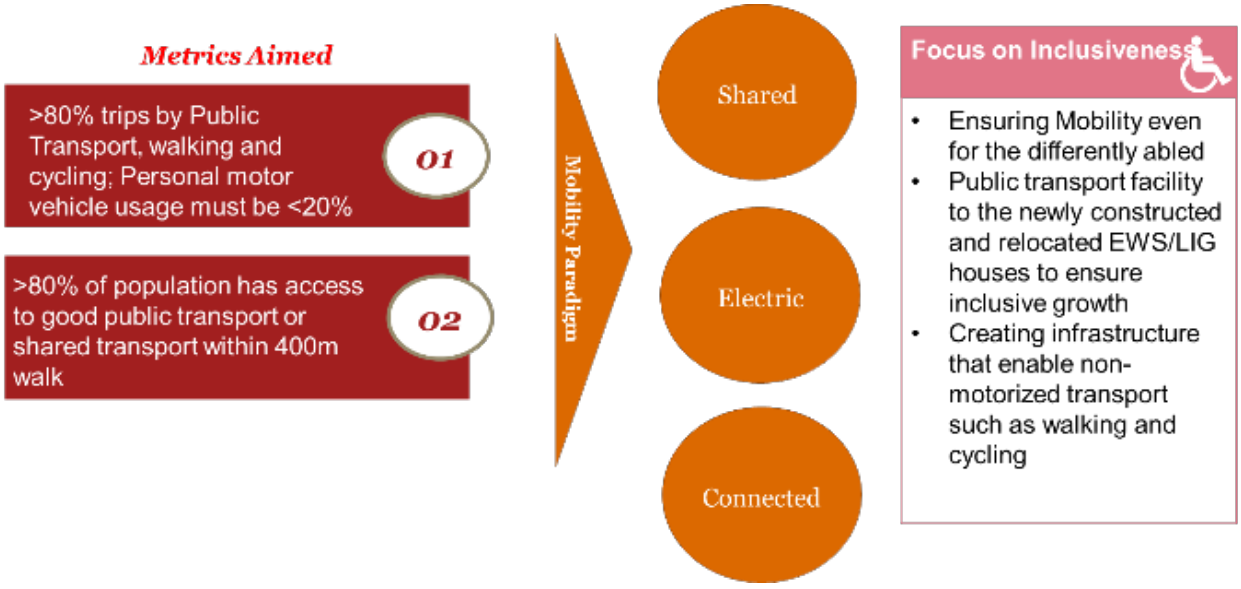
No. of Cars as on 2017-18 in Jharkhand = 344,589

Population of Jharkhand 36,.372 Mn

Jharkhand has 11 nos .of urban agglomerations with more than 1 Lakh population. Great scope for cab/auto aggregators. Ola operating currently in four cities viz. Bokaro, Dhanbad, Jamshedpur and Ranchi.

Sr. No	City/Town	Population in Lakhs (2011 Census)
1	Jamshedpur	13.37
2	Dhanbad	11.95
3	Ranchi	11.26
4	Bokaro Steel City	2.99
5	Deoghar	2.03
6	Phusro	1.86
7	Hazaribagh	1.53
8	Giridih	1.43
9	Ramgarh	1.32
10	Medininaga	1.20
11	Chirkunda	1.18

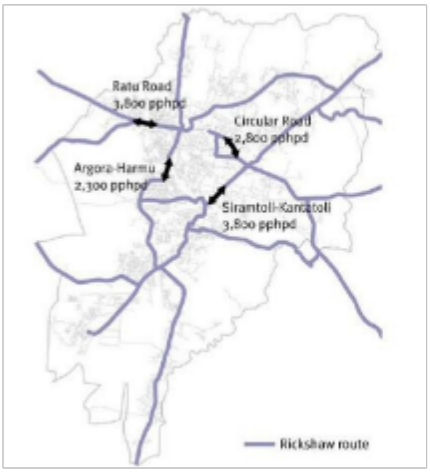
URBAN MOBILITY

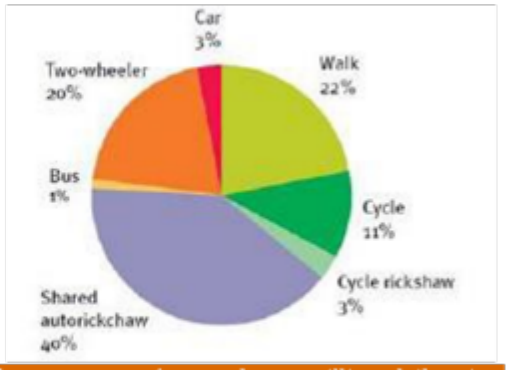


Urban Mobility – Features of Ranchi's Comprehensive Mobility Plan (CMP)

- Trip pattern as per CMP (2015) - Two-wheeler, walk, cycle and shared auto constitute 46.3%, 23.5%, 16.1% and 8.9% of the total trips respectively in Ranchi UA.
- The average walk trip length is 0.44 km, whereas the average trip length is 6.23 km), two-wheeler, cycle and shared auto constitute 60.5%, 21.1% and 11.7% of the total trips respectively in Ranchi UA
- Nearly 91% of the trips made are within 5 kms, 8.5% of the trips are in the range of 5 to 10 kms
- The purpose of trips – Work 31.5%, Education 28.3% and shopping 23.8%
- The average speed during peak hours is 27 kmph
- Jharkhand Government will plan for Public Transport based on the CMP findings and the guidelines of Metro Rail Policy 2017.

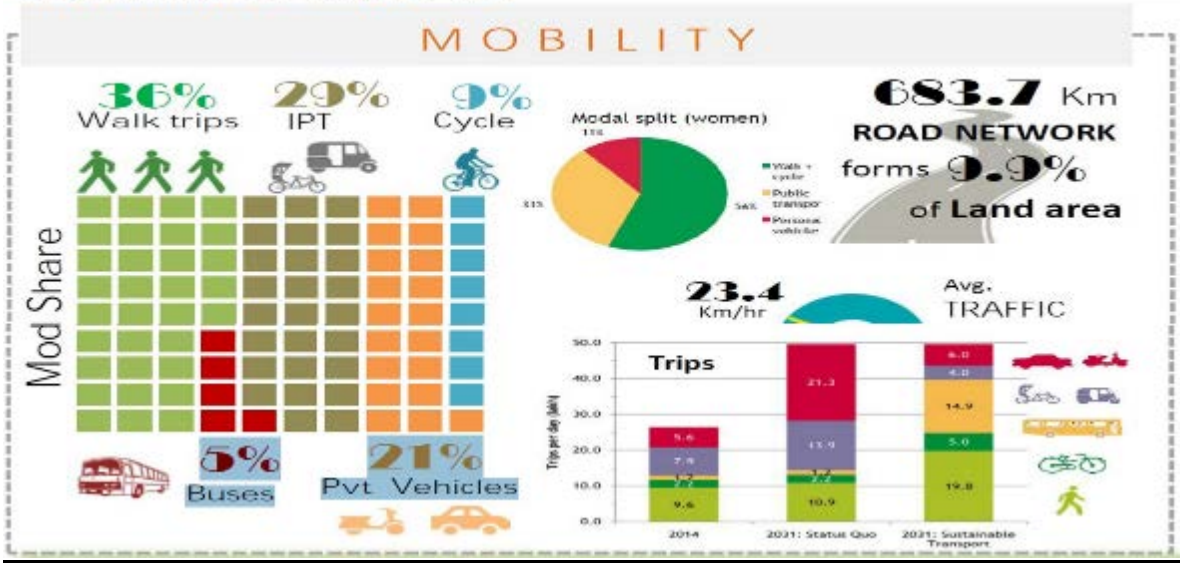
Major findings of CMP of Ranchi





Auto rickshaws account for nearly 1.1 million daily trips, the highest number on any mode in Ranchi. While the official capacity of the larger autorickshaws is 7, they commonly carry 10 to 12 passengers

Major mobility statistics for Ranchi

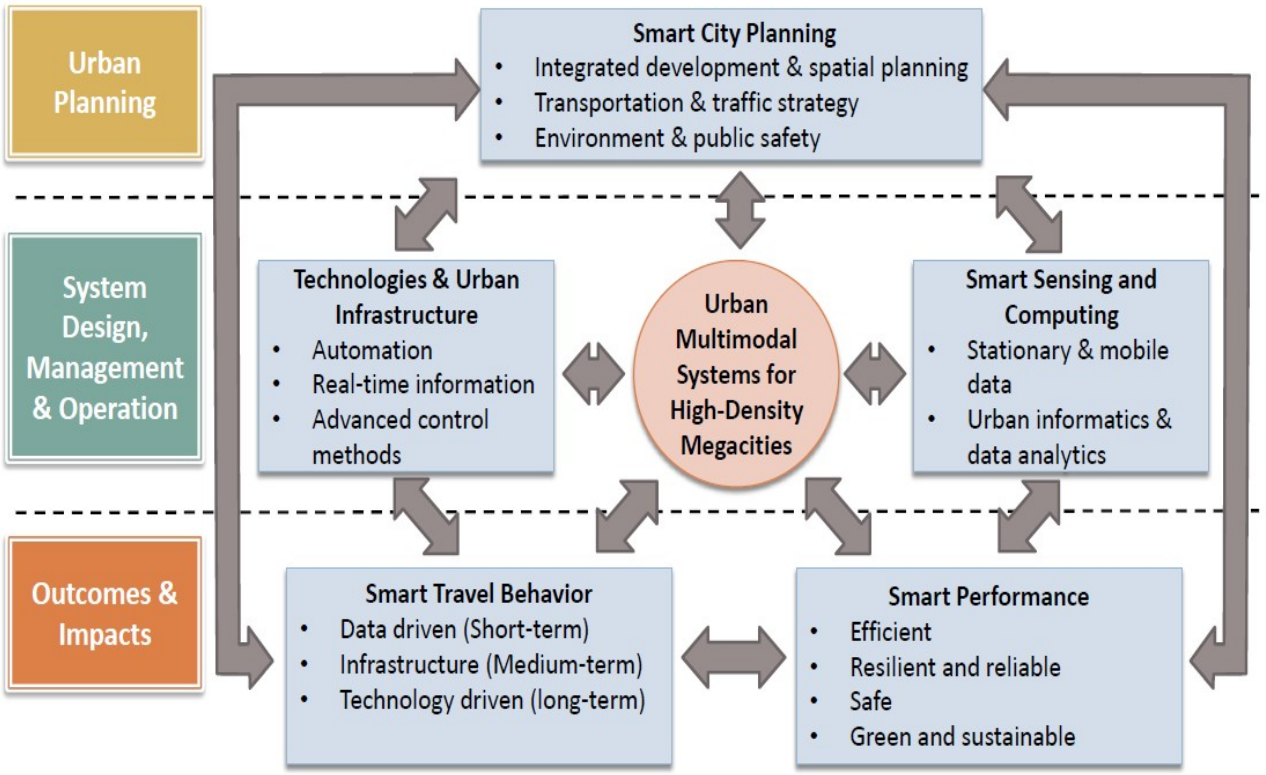


Non-Motorized Transport - Bicycles

- Concept of Public Bicycle Sharing , Smart Parking Systems, Smart Cards introduced in various cities in India
- Promoted as last mile connectivity from key locations such as Bus Stands, Metro Stations, other important places, etc.
- State Urban Development Authority (SUDA) under the Ranchi Smart City Project has an agreement with Chartered Speed for creating 100 Parking Docks and procuring 1200 cycles under the Ranchi Smart City Project to introduce 1200 bicycles.
- Jharkhand Government will introduce Public Bicycle Sharing along with Public Transport.

Intelligent Transport Solutions

Smart Transportation under the Ranchi Smart City Project (overview)



Smart Transportation Planning

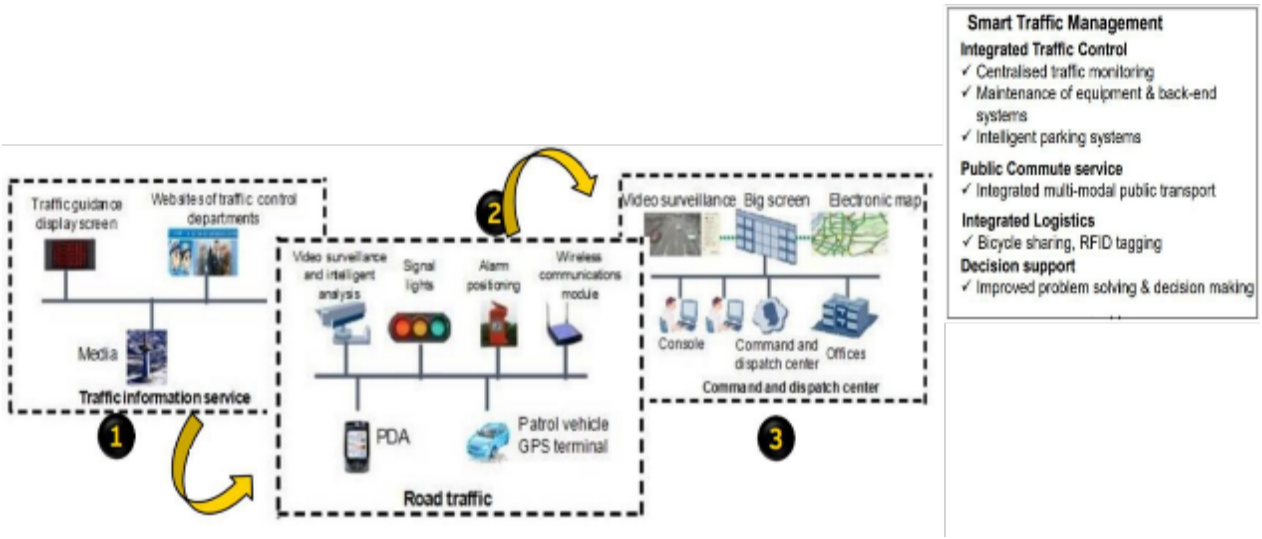
The enabling technologies and urban infrastructure to enhance sustainability, mobility and wellbeing are

- Adaptive signal control
- Automobile sharing
- Walking/cycling facilities
- Bicycle sharing system

Smart Transportation-ICT

**image for PIS and App for illustrative purpose only*

Smart Solution



Smart Traffic Management or Intelligent Traffic Management System (Components)

1. **Adaptive Traffic Control (ATC)**
   - This system will enable the city planners and traffic police department to manage and control the traffic signals using an automated traffic signal management system

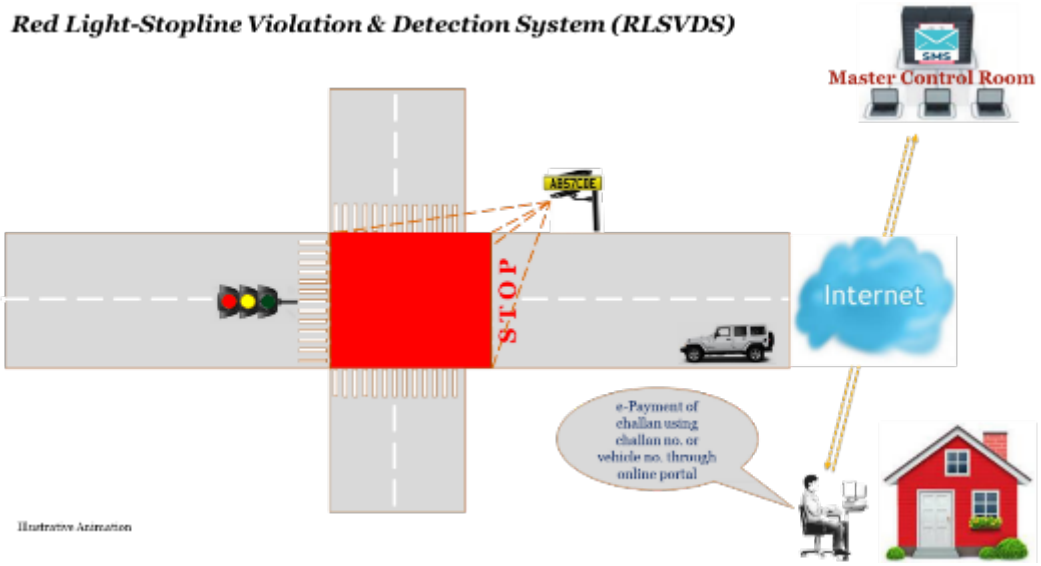
- The ATC system will consist of traffic sensors to collect the average speed, traffic volume and saturation flow rates from the traffic junctions
- The ATC will further relay data on VMS (Variable Message Sign/System) to display ETA to a particular location from a particular point for commuters

VMS at Sahajanand Chowk, Ranchi showing ETA for MG Road, Ranchi

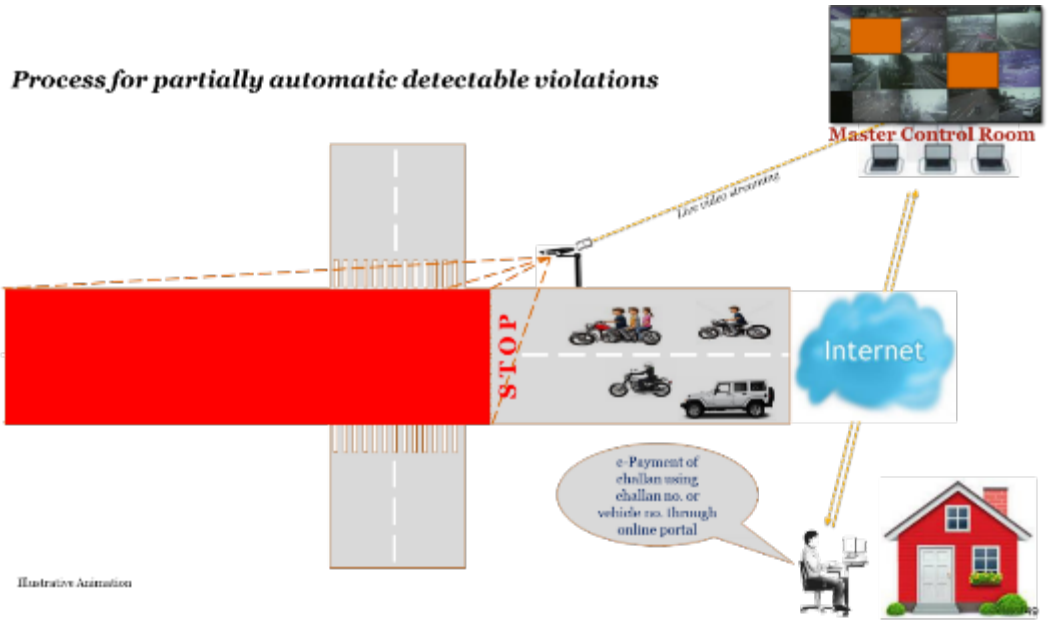
2. Automatic Traffic violations detection

- This system will automatically detect the infractions like red light violations, parking violations and speed violations
- This system will comprise of the violation detection systems like the Radars for detecting over-speeding, Automatic Number Plate Recognition cameras, Red light Violation Detection Cameras to detect the infraction and using the communication infrastructure the violations will be linked to an e-Challan application
- This will integrate with the Vaahan, Sarathi application and issue the Challan for the violation to the registered address

Red Light-Stopline Violation & Detection System (RLSVDS)



Process for partially automatic detectable violations



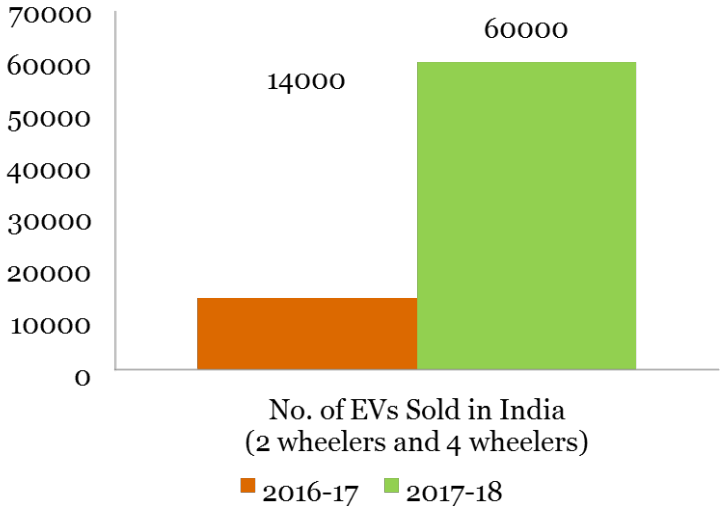
3. CCTV Surveillance system

Location: Argora Chowk, Ranchi

- This will provide real time camera feeds of the junctions, Entry-Exit points of the cities and other strategic locations at the traffic Control Centre.
- Various video analytics features will help to generate automatic alerts

Zero Emission Mobility

Electric Vehicles – Transport Systems



Enablers

- Government's Push (FAME Scheme)
- Demand Aggregation Strategy
- Availability of New Models
- Entry of New Players

3 Million passenger vehicles were sold in India in 2016, EVs represent only a fraction. India EV Sales is 0.1% of global sales, China's share is 50%.

Government Initiatives

- Faster adoption and manufacturing of electric (or Hybrid) Vehicles- Phase II with financial assistance of INR 87.3 Billion.
- Energy Efficiency Services Limited (EESL) to act as demand aggregator for the National e-mobility Programme
- MoRTH has proposed introducing green no. plates, scrapping permit requirement to run commercial EVs, etc.

STATE	Purchase subsidies	Road tax waiver	Registration fee waiver	Subsidies for charging infrastructure	Special subsidies for EV manufacturing
Delhi	✓	✓ (50% waiver)	x	x	x
Karnataka	x	✓	x	✓	✓
Maharashtra	✓	✓	✓	✓	✓
Goa	x	✓	x	x	x

Jharkhand has drafted its own electric vehicle policy (in the process of vetting and approval) in line with its robust Industrial and Investment Promotion Policy 2016 to attract private investments in the state.

Jamshedpur is an Auto Hub and hence Jharkhand Government will leverage its ecosystem to encourage manufacturing consortium to develop a battery and scale production of EVs.

Battery Operated Aggregator app- Rickshaws in Ranchi

- Private company Eco Gadi Taxi services got the approval of Ranchi Municipal Corporation (RMC) to ply 100 e-rickshaws in the city.
- The E –Ricks will be aggregator based through the app 'Humsafar'
- These e-rickshaws will be available for booking for 20 hours a day.
- E-Rickshaws with women drivers from 11 am to 5 pm.
- Jharkhand Government will emulate such arrangements of plying e-rickshaws to other Urban Agglomerates.
- Electric rickshaws has the great potential to boost last-mile connectivity
- In India the majority of battery-operated electric rickshaws are imported from China, the largest
- Manufacturer of electric rickshaws across the globe which are assembled in India

Issues in Battery operated rickshaws

- Battery operated rickshaws killed more than 300 people so far in India.
- No registration of battery operated rickshaws

- No registration number for battery operated rickshaws resulting in inability for police to register cases on accidents and get insurance sum for killed and injured in accidents
- No need for driving license to drive Battery operated rickshaws resulting in unskilled driving and accidents

Regulatory measures for Battery operated rickshaws

- Jharkhand will come up with a comprehensive policy and implementing guidelines to regulate the registration of battery operated rickshaws, driving license, insurance for vehicle, relief for accident victims, etc.

Road Safety

Responsibility/Convergence Matrix

Police Department	• For proper enforcement to ensure motorists refrain from rash and negligent driving .
Department of Health	• For provision of post trauma care facility and saving life in the 'Golden Hour'.
Road Construction Department	• Ensuring all blind/ black spots and accident prone areas are corrected.
Transport Department	• Ensuring fit vehicles ply on the road and proper rules and legislations are made to ensure road safety.

Measures Undertaken for Enhanced Road Safety (Road Related)

➢ Status of corrective measures:

- 383 junctions improved
- Speed calming measures like rumble strip, speed breakers etc at 362 locations
- Truck lay Bays at 29 Locations
- Bus lay Bays at 107 locations
- Bus Shelters/Way side amenities at 36 locations
- Speed Limit Signboards installed at 2857 locations

➢ In light of directions by the Hon'ble Supreme Court's Committee on Road Safety the Design wing of State RCD Central Design organization has been asked to ensure design stage audit of all new road capacity augmentation projects of length 5 km or more.

for Drunk Driving

Motorist driving/riding without Seatbelt/Helmet attending the mandatory 2 hour counselling in Police Control Room

- A total of 154 Alcohol meters have been purchased by the Government of Jharkhand and distributed to local Thanas and DTOs of all 24 Districts
- For the year 2017, a total of 2878 Driver's licenses were suspended as per SC orders for offenses like Drunk Driving, Over-Speeding, Over Loading and Using Mobile Phones
- As per the guidelines of the Hon'ble SC offenders driving/riding without Seatbelt/Helmet have to attend a mandatory 2 hour counselling in Police Control Room. In the year 2017 more than 20,000 offenders were counselled.

Measures Undertaken for Enhanced Road Safety (Post Trauma Care)

- 108 Toll free Ambulance helpline number fully functional
  - Total 339 Ambulances in the process of deployment (50 Advance Life Support and 289 Basic Life Support Ambulances)

Reduction in Road Accidents in the year 2017 compared to 2016

Year	Accident	Fatalities	Injuries
2016	4932	3027	3793
2017	4560	2813	3327
% Change	7.54% ⬇ (Reduction)	7.07% ⬇ (Reduction)	12.29% ⬇ (Reduction)

Inclusive Mobility

Government of Jharkhand Plans to incorporate Nation Wide Best Practice for Inclusive Mobility

Paratransit Cab Service

Disabled Friendly Transport Facilities

Disabled Friendly Infrastructure Bus Stops etc

Provisions for the Specially Abled

**images for illustrative purpose only*

Draft State Action Plan

S.No.	Interventions	Action Plan	Implementing Agency
1.	Increase in number of Interstate Permit	Use of IT based solution for smooth and speedy issuance of permits Have an agreement with UP for Inter-sate permit	Transport Department, GoJ Transport Department, GoJ
2.	EV Battery Manufacturing Hub in Jharkhand	To create favourable policies for manufacturers and subsidies to encourage manufacturing	Department of Industries, GoJ Department of Heavy Industries GoI, NITI Ayog (advisory support)
3.	IT solutions for Traffic Management	Implementation of Intelligent Traffic Management System	Home Department GoJ
4.	Improving Rural Connectivity	Granting sufficient permits under the Gramin Bus Seva Scheme	Transport Department, GoJ
5.	Improving Air Connectivity	Development of more Airports within the State under RCS	Civil Aviation Dept, GoJ

Proposed Institutional and Regulatory Reforms

Proposed Institutional and Regulatory Reforms (Overall)

1. Creating an advisory board for the Transport Department consisting of experts and academicians (from IIT, BIT etc) to advice on Comprehensive Mobility for the state. The State will have to seek appropriate budget for the same.
2. Hiring of consultants if required and seeking budget for the same.
3. Forming Sub-Committees under the State Task Force headed by subject matter experts on various aspects of mobility. These sub-committees will be responsible in monitoring the implementation of their assigned vertical.

4. A Sub-Committee may also be constituted to specifically focus on getting funding and technical expertise from donor agencies like World Bank, IMF etc.
5. The Sub Committees will be monitored twice a year by the State Task force on Mobility headed by the Chief Secretary

Proposed Institutional and Regulatory Reforms – For EV Vehicle Manufacturing hub

A High Power Committee may be constituted at the state level to monitor the implementation of EV use and its manufacturing, and develop procedures and modalities where required. The composition of the High Power Committee will be as follows:

1. Chief Secretary - Chairperson
2. Additional Chief Secretary/Principal Secretary/ Secretary (Industries) - Member
3. Additional Chief Secretary/Principal Secretary/ Secretary (Finance & Planning) - Member
4. Additional Chief Secretary/Principal Secretary/ Secretary (Urban Development) - Member
5. Additional Chief Secretary/Principal Secretary/ Secretary (Department of Higher, Technical Education & Skill Development) - Member
6. Additional Chief Secretary/Principal Secretary/ Secretary (Energy) – Member
7. Additional Chief Secretary/Principal Secretary/ Secretary/ Commissioner (Transport) - Member
8. Municipal Commissioner, Ranchi - Member
9. Two representatives from EV Industry/ State EV Advisory Council – Invitee
10. The High Power Committee may invite any department/ Organization/ representative of Association or a person for its meeting as per need.

Charter of the High Power Committee:

1. Monitor and ensure timely release of relevant Orders / Government Resolutions / Government Notifications and amendments required.
2. Approve the framework/modalities of implementation proposed by the committee in time bound manner.
3. Bring about inter-departmental co-ordination in respect of matters related to this Policy.
4. Review the definitions of EV, EV components, Battery and Charging Station or any other related definitions and approve the amendments as may be appropriate.
5. Review the best practices.
6. The High Power Committee shall review the implementation and effectiveness of the policy every six months and corrective measures / changes / amendments if required shall be done.
7. Constitution of the Jharkhand State EV Advisory council:
8. A “State Electric Vehicle Advisory Council” shall be constituted with support from IIT Madras, IIT Kharagpur, Jharkhand Chamber of Commerce, Tata Motors, JSDMC, IIM Ranchi, BIT Mesra and other industry associations and education think tanks. This council and will have distinguished members from Industry, Academia and Research who will review the progress of EV policy initiatives on both demand and supply side. The council will advise the HPC on remedial measures needed to address any concern as well as course corrections at policy level. This Consultative Committee shall also facilitate

coordination with Government of India in areas requiring support for effective development of EV ecosystem in the state

In a nutshell

Jharkhand's Integrated Seamless Mobility Strategy is aimed at the following levers

- Strengthening transport infrastructure of road, rail, air and inland waterways
- Creating better transport ecosystems
- Leveraging modern technologies like Intelligent Transport System, Shared Mobility, Electric Vehicles, Global Positioning System and Latest information sharing systems to enhance the functionality of transport systems of both urban transport and intrastate transport systems

Jharkhand is determined to offer state of the art transport services to its commuters all across the state and thereby achieve economic growth and employment opportunities.

Karnataka

Background of the state

Karnataka was formed on 1 November 1956, with the passage of the States Reorganisation Act. Originally known as the State of Mysore, it was renamed as “Karnataka” in 1973. The capital and largest city is Bengaluru. Karnataka has a total land area of 191,791 km² and accounts for 5.83% of the total area of the country (measured at 3,288,000 km²). This puts it in seventh place in terms of size. With a population of 6,11,30,704, it occupies eighth place in terms of population. The population density which stands at 319 persons per km² is lower than the all-India average of 382. Of the 6.11 crore population in the State, 3.75 crore people are residing in rural areas and 2.35 crore in urban areas. Karnataka is now among the most urbanised states in India with more than 38 per cent of its population living in urban areas. Karnataka is well connected with 6,572 km of NH, 19,578 km of SH, 3281 km of railway lines. State has one major and 10 minor ports with 320 km of coast line. Karnataka has international airports in Bengaluru and Manguluru, of which Bengaluru is the second most used airport in India with annual traffic of more than 25 million passengers.

Vision for transformative mobility

We endorse NITI Aayog’s goal of developing inter-modal, shared, clean, connected, inclusive, safe, and economical transport to citizens across urban and rural areas.

Existing mobility scenario in Karnataka (through indicators)

The existing mobility scenario is presented in this section based on some indicators of mobility and various Government initiatives being taken up to address the challenges.

Indicators of existing mobility scenario

a. Road Network development

Karnataka has a total of 3,21,818 km of surfaced roads out of which National and State highways together comprise of 26,000 of road network. This indicates a road network density of 1.7 km of roads per sq. km of area, which positions Karnataka among the top states in India regarding road connectivity. Therefore, the state now intends to focus on improving the asset utilisation of these roads.

b. Number of Vehicles registered in Karnataka

Even though the share of private vehicle trips is low, Karnataka is witnessing a 10.5% annual growth rate in absolute number of private vehicles. This is further inducing a tremendous pressure on the road infrastructure in the state, highlighting the need to restrict vehicle growth rate and focus on improve public transport systems. This will further lead to improved road asset utilisation compared to private vehicle based development.

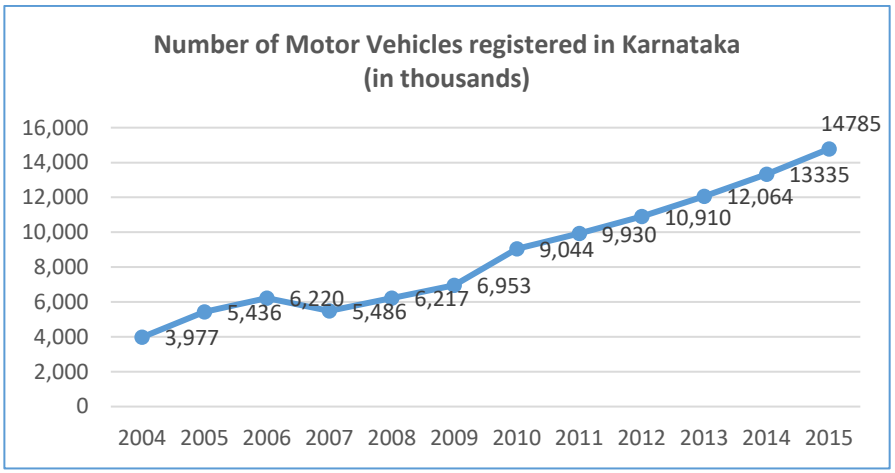
The total number of vehicles registered in the state are includes in the following table and the time-series data of the total number of vehicles in the state is included in the following figure. Just the city of Bengaluru owns about 70 lakh vehicles, which is the second highest in the country after Delhi. The city effectively owns 560 vehicles per 1000 people, which is equivalent to the average vehicle ownership in developed countries like Japan and Germany. This is while our per-capita incomes are still a fraction of these countries. This indicates a dangerous pattern of growth which is personal vehicle dependent resulting in significant congestion and air-pollution impacts in the city. Bengaluru

contributes to more than 60% of Karnataka's GDP and the current transport scenario poses a significant threat to its growing economy.

Total number of registered vehicles (transport & non transport) as on June 2018

No.	Type of vehicles	Bengaluru	Rest of Karnataka	Total
1	Buses	47,978	55,837	1,03,815
2	Autos	1,89,563	2,51,698	4,41,261
3	Two wheelers	52,50,573	92,09,604	1,44,60,177
4	Cars	14,59,177	8,92,719	23,51,896
5	Taxis	1,61,149	1,64,513	3,25,662
6	Others	4,57,669	17,03,663	21,61,332
	Total	**75,66,109**	**1,22,78,034**	**1,98,44,143**

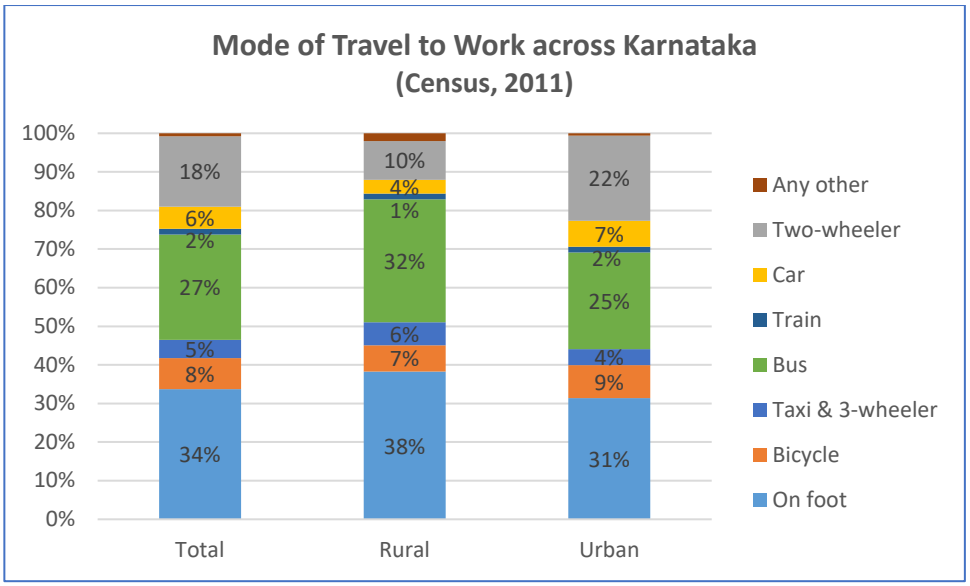
Source: Transport Department, Government of Karnataka



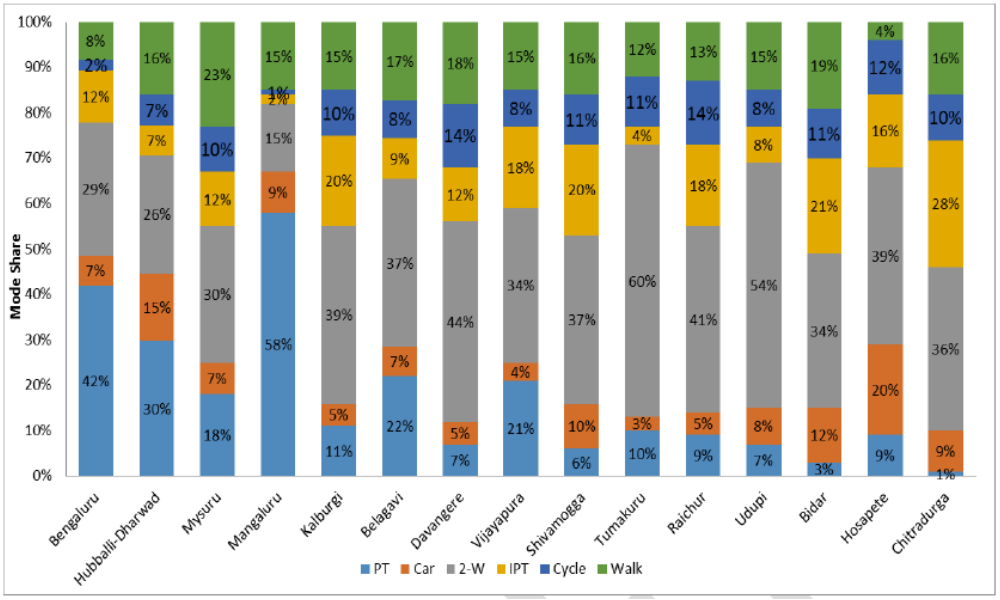
Source: MoRTH, 2015

c. Mobility patterns in Karnataka

The passenger mode choice across urban and rural areas of Karnataka were derived from the Census, 2011 data on travel choice to work. It was observed that across urban and rural areas that 70% of users prefer walk, cycle and public transport mode while travelling to work. The share of private cars and two-wheelers is much lower.



City specific mode shares of travel for fifteen key cities, collected in 2016, is presented in the following figure. The rapid emergence of two-wheelers as a preferred mode is visible from the high mode shares observed across cities. This calls for actions for improved walk, cycle and bus shares in cities.



Mode shares across urban centres in Karnataka (Source: DULT, 2016)

d. Public Transport service provision

Majority of public transport services in Karnataka are provided by bus based public transport offered by State Transport Undertakings i.e. the Bangalore Metropolitan Transport Corporation (BMTC) within Bengaluru and intercity and rural services provided by Karnataka State Road Transport Corporation (KSRTC), North East Karnataka State Road Transport Corporation (NEKRTC), North West Karnataka State Road Transport Corporation (NWKRTC). Together these STUs operate 25,000 buses through a staff of more than 1,17,000. Together, these services cover 77.4% of all habitations in Karnataka and carry a total of 109.88 lakh-km of passengers every day. While the coverage is as high as 99.9% in Nationalised sector i.e. routes with exclusive operations of STUs, it goes down to 65.2% in the remaining sectors, where private operators also provide services. The detailed break up of each

STU's fleet size, depot and terminal details and service coverage is given below. In terms of urban bus services, BMTC with a fleet size of 6,400 buses is currently the largest city bus operator in India, carrying 5 million passengers every day.

Public Bus fleet and infrastructure details in Karnataka

Particulars	KSRTC	BMTC	NWKRTC	NEKRTC	Overall
Divisions/zones	15	06	8	9	38
Depots	81	43	49	50	223
Bus stations	153	63	164	146	526
Vehicles held	8,837	6,542	5,029	4,599	25,007
Total staff	38,371	34,306	24,321	20577	1,17, 575

Public Transport service coverage - Rural Karnataka

• **Corporation**	• **Total villages**	• **Served**	• **Non served**
• **Nationalised Sector (99.9%)**			
• KSRTC	• 7326	• 7319	• 07
• NWKRTC	• 4609	• 4519	• 90
• NEKRTC	• 4838	• 4774	• 64
•	• **16,773**	• **16,612**	• **161**
• **Non Nationalised Sector (65.2%)**			
• KSRTC	• 13,446	• 8,774	• 4,692

Ongoing initiatives to address mobility challenges

It is evident from the above indicators that Karnataka is moving on a highly vehicle-oriented form of development rather than a people oriented system. Such a trend is unsustainable given the high costs incurred on infrastructure provision, congestion, road safety, air-quality and long-term climate change impacts. The Government of Karnataka (GoK), through its various institutions, has adopted a multiple pronged approach to reverse the current trend and prioritise sustainable modes of transport i.e. walk, cycle, public transport and other forms of shared mobility.

The city of Bengaluru and the rest of the urban areas in Karnataka are at varying stages of development and mobility challenges. Therefore, the initiatives for Bengaluru have already evolved to issue specific interventions while for the smaller cities, the interventions are currently at a Policy and planning level. The following are a few ongoing initiatives.

Initiatives across Karnataka

a. **Directorate of Urban Land Transport (DULT) and State urban Transport Fund (SUTF)**: Karnataka has established DULT in 2007, to function under the Urban Development Department and to focus exclusively on urban transport issues across the state. The DULT

provides the overarching institutional framework under which various sustainable urban transport initiatives in the state are taken up. The Directorate is presently responsible for overseeing all Urban Transport Initiatives in Urban / local Planning Areas of Karnataka and administering the State Urban Transport Fund (SUTF), which is used to fund sustainable transport initiatives

b. **Transit Oriented Development** is identified as one of the key priority areas by GoK. Accordingly, amendments to regulatory instruments like 'Town and Country Planning Act' and 'Zonal Development Regulations' have been proposed in the year 2017 to prioritise transit infrastructure, bus bays and terminals in all development plans, while rationalising parking supply to discourage private vehicles. Additionally, these regulations also prioritise planning of adequate traffic carrying capacity, street network hierarchy and circulation plans while taking developmental decisions like Floor Area Ratio (FAR) revisions and building approvals.

c. **Comprehensive Mobility Plans** for all urban areas across Karnataka, to quantify the existing mobility characteristics and benchmark them against national level benchmarks. The specific projects of intervention in each city are identified based on the existing backlogs in service provision, road safety and environmental indicators

d. **Public Bicycle Sharing (PBS)** was introduced by DULT in collaboration with the Mysuru Municipal Corporation and financial assistance by World bank, to promote cycling in Mysuru. The system has 450 cycles across 28 sq. km and is used by 1200-1300 users per day. The success of this system is now being scaled up across the state

e. **Bus Rapid Transit System (BRTS)** is being developed in Hubli-Dharwad along with Transit Oriented Development (TOD) plans along the corridor

f. **Karnataka Electric vehicle & Energy storage** policy has been notified in 2017 to encourage manufacturing and adoption of electric vehicles across Karnataka. Towards successful implementation of this policy, GoK has already provided the budgetary allocation of Rs. 4 Crores for development of 100 charging stations within Bengaluru. The policy is expected to induce rapid transition to electric fleets in the state

g. **High quality city bus services:** Karnataka has a total of 44 urban centres which have city bus services, making it one of the best states in terms of urban public transport. Bengaluru with its fleet of 6,400 buses is the largest fleet of city bus services in India. It is continuing to evolve with changing times by adopting Intelligent Transport Systems (ITS), data analytics for improved performance efficiency, demand oriented route rationalisation, improved vehicle maintenance and emission reduction measures, providing services across premium and affordable platforms etc.

h. **Efficient rural public transport:** KSRTC, NEKSTC and NWKSRTC, the three public bus agencies in Karnataka provide bus services to 99.9% of villages in Nationalised areas i.e. where they have exclusive rights on stage carriage permits. The Nationalisation exercise helped these agencies to have control over both profitable and loss-making routes, thereby helping them in balancing services across both. The three agencies are among the best

public bus agencies across India in terms of passenger facilities at terminals, high quality buses, digital ticketing and route information etc.

Initiatives in Bengaluru:

a. **TenderSURE roads** i.e. roads with detailed technical specification on developing streets that prioritise Non-Motorised Transport (NMT) i.e. walk and cycle have already been implemented in Bengaluru. Building on their success, they are now being scaled up across the entire state

b. Metro rail system: Bengaluru Metro is also known as Namma Metro, is being built in phases. The Phase-1, containing Green (24.20 km) and Purple (18.22 km) lines of total 42.42 km, has been completed and is in operation. Phase 2 spans a total length of 89.09 km which includes the extension of the two Phase 1 corridors as well as the construction of three new lines.

c. Exclusive bus lanes are being planned across the key corridors in Bengaluru to take buses out of congestion and improve travel speed and comfort of their users. A detailed design report for a 20km corridor along the Old airport road in the city is currently under review

d. **Integrated public transport hubs** are being developed for effective physical integration between urban and rural services, bus and rail based public transport services and their connectivity to nearby areas. Bengaluru has already developed 17 Traffic and Transportation Management Centres (TTMCs) across the city. Station Accessibility Plans for 13 metro stations in Bengaluru have already been prepared, out of which 4 stations are also integrated with the city and intercity bus terminals. These will be taken up for implementation in a phased manner

e. Fare and information integration across public transport modes is being developed through various hardware and software initiatives like smart cards, mobile applications, smart tickets and offline initiatives like Sugama, which provides a common ticket for urban and rural services

f. Electric buses (e-buses) in Bengaluru: The BMTC is at an advanced stage of deploying 80 electric buses in the city of Bengaluru. Learnings from the implementation of these buses will be used to scale up the e-bus deployment across the city and the rest of the state

g. Aggregator rules for shared mobility: The regulatory framework under which app based shared mobility like Ola and Uber operate have already been released by the state. Means for their integration with formal public transport are now being developed

h. Data analytics for public transport is currently being pursued by BMTC in collaboration with academic institutions and think-tanks like Indian Institute of Science (IISc), World Resources Institute (WRI) and Indian Institute of Management (IIM)-Bangalore

i. Parking Policy has been adopted for Bengaluru with the objective of managing car and two-wheeler parking on the streets and pricing them adequately such that users are dis-incentivised towards using their personal vehicles

j. Congestion pricing is being planned in various parts of Bengaluru to price private vehicles on these areas and incentivising them to shift to public transport services. Various locations for area and line pricing have been identified by the city

k. **Intelligent Transport System (ITS)** master plans have already been prepared for Bengaluru and Mysuru for integrated traffic management. They'll now be taken up for implementation in a phased manner

l. **Integrating Intermediate Public Transport (IPT)** through various planning and infrastructure measures

Gaps in existing mobility system

The increased urbanisation is putting a heavy pressure on the already over-saturated urban transport network, thus adversely affecting the productivity in urban areas. Transport planning and urban planning have to work in tandem. It is essential to formulate the Master Plans duly considering the organic growth of the urban areas. This requires that the circulation /street pattern proposed in the Master Plan are based on the scientific analysis of the traffic volume/density studies; origin destination studies; statistics of increase in number of vehicles over different periods of time etc. The Zonal Regulations are to be formulated keeping in view; i) prevention of congestion, ii)optimum utilization of the road spaces, iii) road width based FAR to regulate densities; iv) to ensure development of the urban areas in accordance with the hierarchy of roads of the Master plan v) encouraging Non-Motorised Transport.

In spite of the best efforts from GoK and the concerned departments in augmenting public transport and road transport infrastructure, significant gaps exist in the transport sector. These gaps have been summarised below under three categories of mobility:

i) Gaps in urban mobility

The key gaps faced for in urban or intra-city mobility can broadly be classified as issues faced by Bengaluru and the gaps faced by rest of the smaller urban centres in Karnataka.

ii) Gaps in mobility in Bengaluru

- **Increasing congestion and travel time**: Despite Bengaluru having the largest supply of public transport i.e. Metro and Bus systems in the city, the city also has the second highest number of vehicles in the country. This is leading to significant congestion in the city. Congestion caused by private vehicles like cars and two-wheelers have led to significant delays even for bus users, who are being penalised despite benefiting the city by reducing per-capita road space requirements. The lack of priority in street Right of Way (RoW) and signals have also led to increasing commute time in public transport.
- It is estimated that the average traffic speeds in Bengaluru have come down from 20kmph to 9 kmph over the past decade. Average fuel efficiency of public transport buses is significantly reduced and the bus utilization is reduced from 221 Km/day to 204 Km/day. According to a study carried out recently, it is estimated that the city loses a whopping Rs 38,000 crore (5.92 Billion USD) every year as the social cost of traffic congestion.
- **The lack of adequate street infrastructure** like pedestrian and cycling facilities, street lighting, bus bays etc. have also led to a shift away from walk and cycle modes. Since these modes are

also key contributors to the first and last mile access to public transport, even bus ridership is impacted due to inadequacy of same.

- **Lack of multi-modal integration:** The lack of integration between various public transport modes i.e. Metro, Bus, Sub-urban rail and inter-city transfer hubs is another key impediment for public transport users. The current lack of integration necessitates multiple transfers and thus the commuters are forced to move away from public transport.
- **Lack of on-demand public transport:** The current form of fixed route and fixed schedule public transport hasn't kept pace with the changing user preferences for on-demand mobility. The lack of flexibility in public transport to dynamically vary their routes and schedules according to changing travel demand patterns is also a key area of improvement
- **The suboptimal asset utilisation of public transport** i.e. the limitations in capability to re-direct fleet deployment according to changing city demands and maximising ridership and revenue has also led to underutilization of available assets
- **Lack of commute time planning for public transport:** Despite adequate evidence that private vehicles cause congestion, the city's infrastructure development initiatives focus on augmenting road capacity through widening and elevated roads. This is due to the current priority to increase traffic speeds on roads, which implicitly support private vehicle oriented infrastructure.
- Instead, a public transport specific approach is required wherein cities plan for end to end journey of public transport users and identify measures like bus-priority lanes, signal priorities etc. to reduce journey times of users. A zonal level plan to identify measures needed to improve public transport commute time is required in Bengaluru. Such a plan will incorporate measures like integration between metro, bus and last mile connectivity solutions

iii) Gaps in mobility in smaller cities

- The congestion levels in the smaller cities haven't yet reached the levels of Bengaluru. However, even they suffer the problems of lack of adequate public transport services and street infrastructure for walking, cycling and access to public transport
- **Lack of dedicated bus services**: The smaller cities don't have an institutional mechanism for exclusive city bus services. The current bus services are provided by STUs which also cater to sub-urban and rural services, without adequate number of intra-city fleets. This is due to the lack of enough revenue recovery to support operations with the current subsidised fares.
- The lack of service obligations and cross-subsidy mechanism from municipal finances, inter-city bus services etc., is leading to the lack of required bus capacity in these cities

iv) Gaps in rural-urban connectivity

- **Gaps in coverage:** The coverage of villages in the sectors where permits have been Nationalised is 99.9%. Whereas, in the non-Nationalised sectors the coverage has been only 65%. Improving this will require a detailed analysis to identify the presence of alternative modes and identifying strategies to complement with private services and improve public transport coverage.

- **Gaps in frequency:** Despite high coverage, many villages only have two services per day which don't necessarily meet with the travel demand of users. Therefore, a detailed assessment of the required increase in capacity and the mechanism to finance it will need to be developed
- **Intermediate Public Transport (IPT)** to meet affordability and comfort needs: Meeting the affordability of public transport fare for the poor while also meeting their expectations of comfort is an ongoing area of focus in rural transport. In order to meet affordability requirements in smaller areas, Intermediate Public Transport (IPT) services which offer low-capacity and high frequency services can be assessed as an alternative to the traditional high capacity bus systems

v) Gaps in inter-city transport

- **Inadequate frequency of premium services**: KSRTC and its subsidiaries offer a wide-range of premium inter-city bus services like Airavat, Ambari and Fly bus. These services offer high quality services to users. However, their presence is limited to the larger cities, while many other urban centres don't have adequate high quality bus services.
- Cities need to formulate strategies to ensure adequate frequency of premium inter-city services to arrest the increasing trend of private cars and taxis for intercity travel.
- **Lack of price-cap on private bus operators:** In some sectors private bus operators offer premium bus services. However, there's no price control mechanism on these services. This leads to a massive increase in ticket fares during peak seasons, making the services unaffordable for passengers. Therefore, a moderated price mechanism where Government identifies a base rate and upper limit of fares is proposed to ensure affordability of these services
- **Inadequate way-side amenities:** The lack of adequate way-side amenities such as toilets, restaurants and resting places along highways are leading to inter-city buses operating for long hours without break. This further leads to lack of safety caused by driver fatigue. Therefore, states need to create such amenities and mandate a break after every 3-4 hours of operation for improved safety

The subsequent sections of the strategy document identify measures to address these gaps.

Objectives of mobility in Karnataka

Transport sector is identified as one of the key drivers of development by the Government of Karnataka (GoK) and we have been taking multiple measures towards proactively improving the infrastructure and services provided within the sector. We propose the following specific goals towards achieving the stated vision:

- Achieve a modal share of 75% passengers on sustainable modes of transport i.e. public transport, walk, cycle and other shared modes of transport
- Reduce emissions intensity of Karnataka's transport sector by 33% per-capita by 2030, in line with India's INDC commitments

- Provide public transport services within 500m of all habitations across rural and urban areas
- Target 100% Electrification in commercial passenger vehicle fleets by 2030 and private vehicles by 2040
- Making Karnataka the preferred destination for Electric Vehicle (EV) manufacturing

Strategies for transforming mobility

The rapid pace of development of Karnataka has led to significant backlogs in transport infrastructure and public transport services in the state. This has led to problems such as increased congestion and air pollution in Bengaluru and other urban areas, while the rural areas suffer from lack of adequate access to mobility and increasing road safety issues. Government of Karnataka (GoK) has taken up various efforts to address these traditional challenges. The recent years have also seen a rapid emergence of 'New Mobility' solutions like electric mobility, app based shared mobility and connected vehicle technologies.

The various ongoing initiatives and gaps in the existing mobility scenario of Karnataka have been identified in section 3. We propose the following strategies for transformative mobility in the state, which address the traditional infrastructure and service backlogs identified above while also harnessing the opportunities provided by 'New Mobility' solution providers.

Re-inventing public transport

While Karnataka has one of the best bus systems in India, the state still faces backlogs in services across urban and rural areas. We propose the following strategic initiatives to strengthen public transport in the state

i. Introducing 'Public Transport Service Obligations' and 'Public Transport Fund'

a. Learning from the telecom, banking and electricity sectors, we will develop 'Universal Service Obligations' for public transport systems across urban and rural areas in Karnataka and will work with public and private agencies towards meeting these obligations

b. Service obligations will be mandated separately for urban areas, rural-urban connectivity and for inter-city bus services. These will include coverage, frequency, affordability and comfort benchmarks for public transport services

c. A gap assessment of the existing public transport services will be carried out for urban areas, urban-rural connectivity and inter-city bus services. The public transport service obligations along with the gap assessment will inform the state Government on the investment needs to improve bus services

d. A dedicated 'Public Transport Fund' will be created to ensure adequate funding to meet the public transport service obligations. The fund will be receive budgetary allocations from the state urban

transport fund, Bengaluru urban transport fund and other alternative sources of funds including private investments, multilateral financing institutions etc.

e. We will also dis-incentivise private vehicles through measures like taxation, parking fee and congestion pricing and use the funds raised for the 'Public Transport Fund'

ii. Integrated Governance and prioritisation of public transport, walk and cycle infrastructure

a. We have initiated constitution of a Unified Metropolitan Transportation Authority (UMTA) for Bengaluru under the chairmanship of Hon'ble Chief Minister of Karnataka to bring all agencies working on transportation under one umbrella

b. The UMTA will expedite development of sustainable transport systems like metro systems, bus priority lanes, transit hubs, footpaths and cycle infrastructure across Bengaluru and other cities

iii. Increasing Public transport capacity and improving multi-modal integration within cities and for urban-rural integration

a. The bus system capacity, coverage and level of service will be improved significantly in the coming years. The 'Public Transport Fund' will be used to increase bus fleets, depots and terminal capacity to meet inter-city and intra-city public transport demands adequately

b. Simultaneously, the metro rail system and suburban rail systems will also be implemented to improve the public transport system within Bengaluru. It is expected that the Phase 2 works will be completed by 2023 and would provide connectivity to the city's important tech hubs of Electronics City and White Field. The metro has an average daily ridership of 315,000 passengers. The state is also proposing to implement Phase 3 having a total length of 127 km of network

c. The UMTA will also ensure physical, fare and information integration across multiple public transport modes such that the increased capacity of the system is efficiently utilised in urban areas

d. Improved urban-rural integration will be pursued by creating interchange hubs at the entry locations to cities, where passengers can transfer from rural to urban services like metro and city buses. Seamless connectivity will be provided through integrated fares and service information

Harnessing 'Shared Mobility' to complement public transport

The Government provided public transport and private forms of shared mobility like Uber, Ola and auto-rickshaws are currently operating in competition, leading to oversupply in a few corridors and undersupply in the rest. This is due to a gap in the demand-supply equilibrium while deciding on transport services. We propose to move towards an integrated system where public transport remains the primary form of shared mobility, while other forms complement the system by providing demand responsive services for first and last-mile connectivity. We propose the following initiatives towards this:

i. Creating a level playing field between public transport, app based shared mobility and auto-rickshaws through regulations

a. A hierarchical regulatory mechanism will be adopted where the number of permits issued, vehicle taxation and fare slabs will be fixed according to the mobility and environmental impacts of the modes

b. Buses will be prioritised, followed by auto-rickshaws and taxis among shared mobility

c. Public transport to be given the primary priority and the other modes will be acting as a complementary service

d. All modes of shared mobility will be regulated through a common set of 'transport regulations' rather than the varied set of rules currently being adopted

ii. Introducing Mobility as a Service (MaaS) to integrated public transport and shared mobility

a. '**Mobility as a Service (MaaS)'** is a web or mobile platform to enable passengers to book a journey from origin to destination, covering all shared transport modes like bus, metro, bike hiring, taxis and rail. It will enable users to travel in public transport seamlessly across modes i.e. using public transport where possible and other demand responsive modes like Ola, Uber etc. as feeder services

b. We will develop MaaS for Bengaluru to act as a common booking platform across public transport and shared mobility. Incentives for MaaS adoption will be provided. For eg. assured seat reservation, discounts for bulk purchase etc. for users purchasing Origin to Destination tickets in combination of multiple modes

iii. Introducing public transport led 'Bus aggregation' services

a. Bus aggregation implies provision of on-demand bus services where fixed schedule services aren't adequately available

b. BMTC led bus aggregator services will be introduced in collaboration with private operators and investors

c. Such a model will ensure private investments in public transport while also complementing the existing bus services

Improving Rural Public Transport and Urban connectivity

Karnataka already has a fairly well connected road network to provide basic access for passenger and freight mobility. The road network will be improved through various Central and State supported schemes as required as the state increases in population. However, the immediate strategic priority in rural areas will be to improve public transport services in these areas. The following initiatives will be taken up as a part of this:

i. **State level public transport gap assessment**: A detailed assessment of the existing service gaps in rural areas will be taken up. As explained above, only 74% of rural areas currently have access to formal public transport services. Within these, many villages only have basic connectivity i.e. one or two public transport trips per day. Therefore, a detailed study on the level of service requirements of various villages will be taken up to establish an action plan for service improvement

ii. **Increasing rural-urban public transport connectivity:** The gap assessment will be used to establishing 'Public Transport Service Obligations' for rural areas. Further, connectivity of various rural areas to their nearest urban centres will also be improved through adequate public transport route network and service improvements

iii. **Integrating paratransit systems and public transport:** In the absence of a formal public transport system, majority of the shared mobility needs in rural Karnataka are being met by shared auto-rickshaw which act as paratransit or informal transit service. We will harness the low-capacity and high-frequency services they provide and integrate them with formal bus systems planned for these areas.

iv. **Required physical infrastructure** like bus terminals etc. will be provided for rural public transport

Regulatory measures for Transit Oriented Development

Ensuring upcoming developments in Karnataka-both urban and rural, to be focussed around transit areas is a key priority area for GoK. Towards this, we propose a regulatory approach as detailed below

i. **Amendments to 'Town and Country Planning Act' of Karnataka**: The Town and Country Planning act lays out the principles based on which 'Master Plans' and 'Development Plans' are made in the state. Karnataka has already identified developing mixed land-use neighbourhoods and prioritising public transport infrastructure like bus bays, terminals and depots within master plans and development plans. We will ensure effective and time-bound implementation of these provisions to incentivise transit oriented planning in the state.

ii. **Revised Zonal regulations of Karnataka**: The zonal regulations play an important role in deciding the urban form, types of land-use and density of development. Karnataka has already notified the proposed amendments to the Zonal regulations in 2017. The rules specific to these regulations will now be prepared. Adequate provisions will be included in these rules to ensure transit oriented development across the State.

iii. **Planning street network hierarchy for efficient traffic circulation:** The Planning Authorities will be mandated to incorporate the circulation/street pattern in their respective Master Plans based on the outcomes of the traffic volume/density studies; origin destination studies; statistics of increase in number of vehicles over different periods of time etc. A Connectivity Index for motorized and non-motorized travel will be developed to quantify and monitor how well a road way network connects destinations.

Promoting electric mobility and other clean vehicle technologies

GoK has already adopted the 'Karnataka Electric Vehicle and Energy Storage Policy-2017' that promotes various fiscal and non-fiscal incentives for EV manufacturing and adoption in Karnataka. As a part of this, all electric vehicles are exempted from registration tax. Manufacture of EVs, battery and charging infrastructure promoted through the policy. Other clean vehicle technologies like Bio-fuels, Fuel cell vehicles will be encouraged in the future. We will continue pursuing the required demand generation, technology and financial incentives towards achieving this vision. We also propose the following specific strategic actions

i. We will aim to convert 100% of our public transport, taxi and three-wheeler fleets to electric mobility and other clean vehicle technologies like bio-fuels and fuel cells by 2030 and all personal vehicles by 2040

ii. Introduce subsidised electricity tariffs for public transport fleets immediately and regulatory disincentives for fossil fuel based vehicles

iii. Transitioning KSRTC and BMTC fleets to 100% 'Zero emission fleet' by 2030

    a. This will include purchase of new vehicles

    b. Retrofitting of existing vehicles will be pursued

iv. GoK will support Research and Development (R&D) of electric mobility and other clean technologies through financing and other technical assistance

v. **Creating charging infrastructure**: All commercial and large building permits will include a mandatory clause of providing charging infrastructure in their parking

vi. Integrated planning and implementation of Electricity and Transport infrastructure will be carried out to enable provision of charging infrastructure according to mobility needs (i.e. high demand nodes, bus depots etc.) and availability of electricity infrastructure (sub-stations, transformers etc.)

Non-Motorised Transport (NMT) infrastructure and services

We will leverage the state-wide presence and technical competence of the Directorate of Urban Land Transport (DULT) to advance sustainable mobility initiatives across cities in Karnataka. This will include creating infrastructure for pedestrians and cyclists, developing shared cycling services etc. through the following initiatives:

i. Developing pedestrian & cycling friendly streets by scaling up the 'TenderSURE roads' success across Karnataka

ii. Scaling up Public Bicycle Sharing (PBS) systems in Mysuru to Bengaluru and other cities across Karnataka. In cities where commercially viable PBS systems aren't feasible, we will pursue a co-operative cycle sharing system.

iii. Implementing Bus Rapid Transit (BRT) system in Hubli-Dharwad and developing similar systems in Bengaluru and other cities

iv. Implementing the Parking Policy developed for Bengaluru and developing similar strategies for other cities

Intelligent Transport Systems, Connected Vehicle technologies and Data analytics for dynamic shared transport and maximising asset utilisation

KSRTC and BMTC have also taken up various 'Intelligent Transport System (ITS)' initiatives that generate high-quality data on the exiting performance of the bus systems. Both the agencies have been working on 'Open Data Policies' to disseminate data from the ITS systems with public such that it can be used to improve the systems. Going forward, GoK is planning to implement a Centralised ITS system to manage both urban and inter-city bus services. GoK will also pursue the following objectives

i. Develop '**Data Analytics' solutions** that improve the operational efficiency of public transport systems. This will include:

   a. **Improving reliability**: Use the data from ITS system to rationalise schedules to move them from fixed-speed based schedules to actual travel time based schedules for various hours of the day

   b. **Flexible scheduling**: Analyse travel demand data across cities and regions to identify under-served and low-demand areas. The bus operations planning will be made more flexible such that fleets can be re-allocated from low to high demand areas dynamically

   c. **Serving niche markets**: Work on initiatives that provide end to end mobility for niche markets like senior citizens, people with disabilities, airport bound travellers etc.

ii. Adopting real-time control strategies

   a. Real-time control strategies to monitor vehicles and provide feedback to the operations team, so that services can be improved real-time. For eg. Avoiding bus bunching, re-allocating buses to high-demand routes etc.
   b. Reallocating some fleets from the current fixed network based operations to a more dynamic routing and scheduling system
   c. Improving customer experience based on feedback received on crew performance evaluation
   d. Application of ERP based solutions along with ITS solutions is also likely to have a big scale-up effect

iii. Integrated traffic management and signal prioritisation will be pursued through ITS initiatives. This will facilitate adequate traffic speed and signal prioritisation for public transport, thereby making it faster than the private vehicles

iv. Data analytics for demand responsiveness and optimal asset utilisation

a. We will partner with the technology industry in Bengaluru to build adequate data analytics capabilities

b. This will help us improve the demand-responsiveness of our public transport services, increase efficiency of utilisation of our assets like roads, buses, staff etc.

Capacity building

Implementing many of the above mentioned strategies will require technical competencies which are not currently available with the Government agencies in-charge of implementing these solutions. Therefore we propose to take up various capacity building measures, including but not limited to the following:

i. Amending Cadre and recruitment rules (CRR) for bringing in skilled professionals and subject matter experts on various Policy, Planning and Technology issues

ii. Allowing flexibility to induct professionals through lateral entry provisions on short-term tenure basis

iii. Build contract management and electric vehicle technology expertise to manage a lease based electric bus fleet systems

State action plan

S. No.	Interventions	Key Action Areas	Implementing agencies	Deadline
1	Re-inventing Public Transport for Urban transport and Rural connectivity	Adopting ‘Public Transport Service Obligations’ and 'Public Transport Fund' for Urban and Rural Areas	State Transport Authority	2019
		Assessing service level gaps and preparing strategic public transport improvement and investment plan for Karnataka	DULT, KSRTC, BMTC	2019
		Constitute Unified Metropolitan Transport Authority for Bengaluru and initiate 'Bengaluru Urban Transport Fund' through taxation and user pricing methods	State Urban Development Department (UDD)	2019
		Mobilising 'State Urban Transport Fund' and 'Bengaluru Urban Transport Fund' to meet public transport investment needs	DULT, UDD	2019
		Create bus priority lanes across all congested corridors in Bengaluru and other urban centres	BBMP, BMTC, DULT	2020
		Develop transport hubs for multi-modal integration through Public-Private Partnerships	BMRCL, BMTC, KSRTC	2022
		Introduce open loop payment systems for common ticketing across public transport modes	BMRCL, BMTC, KSRTC	2020
2	Harnessing shared mobility	Introduce 'Mobility as a Service (MaaS)' pilots in Bengaluru	BMRCL, BMTC, Transport Department	2019
		Scale up MaaS across Bengaluru and other urban centres in Karnataka	State Transport Authority	2022
		Establish integrated regulatory, taxation and pricing mechanisms across shared modes of transport according to their congestion and emission implications	State Transport Authority	2020
3	Regulatory measures for 'Transit Oriented Development'	Time bound implementation of amendments to Town and Country Planning Act	UDD	2022
		Development of Zonal development rules that promote transit oriented development	UDD	2019
4	Promoting electric mobility	Initiate induction of 500 electric buses in Bengaluru	BMTC	2019

S. No.	Interventions	Key Action Areas	Implementing agencies	Deadline
		Mandate only electric buses, three-wheelers and taxis in new fleets from 2025	State Transport Authority	2019
		Mandate conversion of all existing and new commercial vehicles to electric by 2040	State Transport Authority	2019
5	Prioritising Non-Motorised Transport	All urban roads in Karnataka to be mandated to follow TenderSURE specifications from 2022	UDD	2019
		Introduce 'Public Bicycle Sharing' and 'Cooperative Bicycle Sharing' across all urban areas	DULT	2020
		Implement Parking policies across urban areas to minimise on-street parking of cars and two-wheelers	DULT	2019
6	Adoption of 'Intelligent Transport Systems' and 'Data Analytics'	Establish a 'Common Intelligent Transport System' across Karnataka covering public transport and traffic operations management	DULT, KSRTC, Traffic Police	2022
		Adopt state of the art data analytics techniques to improve demand responsiveness and performance efficiency of public transport systems	BMTC, KSRTC, BMRCL	2019
		Adopt real time control strategies for better traffic circulation and prioritisation for public transport	Traffic Police	2020
7	Capacity Building	Hire full time professionals and subject matter experts for advisory support across all Government departments	All Departments	2019
		Upgrade existing training centres to reflect technical skills required to handle latest technological and infrastructure developments	State Transport Authority	2019

Proposed institutional and regulatory reforms

We propose a two level institutional framework to address mobility issues in Karnataka. The Directorate of Urban Land Transport (DULT) will be the state level nodal agency to drive Policy, Planning and Financing efforts by coordinating will all urban areas. To address the unique challenges faced in the city of Bengaluru, a Unified Metropolitan Transport Authority (UMTA) will be set-up. The role and functions of these agencies are explained in the following sections:

Directorate of Urban Land Transport (DULT) for state level urban transport Policy, Planning and Financing

Karnataka has established the Directorate of Urban Land Transport (DULT) in 2007, to function under the Urban Development Department and to focus exclusively on urban transport issues across the state. The DULT provides the overarching institutional framework under which various sustainable urban transport initiatives in the state are taken up. The Directorate is presently responsible for overseeing all urban transport initiatives in urban / local planning areas of Karnataka and administering the State Urban Transport Fund (SUTF).

DULT has been instrumental in providing Policy, Planning and Financing support to various urban mobility issues in the state including the following:

i) Comprehensive planning through Preparation of Mobility Plans

ii) Providing technical assistance to agencies regarding traffic management

iii) Planning and implementation of non-motorised transport (NMT) projects

iv) Policy formulation on urban transport issues, strengthening public transport capacity Building

DULT will continue to play a key role in institutional integration and technical support for mobility issues in the state.

Unified Metropolitan Transport Authorities (UMTA) for integrated planning and development of transport systems in Bengaluru

The city of Bengaluru is facing a rapid scale of development and increasing mobility issues, which are unlike any other city in the state. Therefore, the GoK, in the budget for FY 2018-19, has announced the formation of a Unified Metropolitan Transport Authorities (UMTA) exclusively for the city of Bengaluru. UMTA will function under the Chairmanship of the Hon'ble Chief Minister of Karnataka, with the Additional Chief Secretary (ACS) of Karnataka as the Chief Executive Officer (CEO). , comprising of all key departments concerning transportation in the city.

UMTA would holistically oversee formulation of proposals by multiple agencies involved in provision and management of urban transport such as municipal corporation(s)/municipality(s), development

authority, transport department and traffic police; including their strategy and policy functions, regulatory functions, transport demand management, resolution of day to day matters and monitoring works assigned to these implementing agencies.

The UMTA is intended to achieve inter-agency coordination while planning for the transport system and ensure that the mobility system of the city prioritises public transport, walk and cycle users in their planning, infrastructure development and service provision

- **Public transport focus in UMTA**
    - An 'Executive Committee' under the chairmanship of ACS, GoK will be constituted to coordinate implementation of the decisions of UMTA
    - A separate 'Shared Transport Committee' will be constituted within UMTA to deliberate on matters specific to integration between BMTC, BMRCL, KSRTC and other shared mobility operators like Ola, Uber, Three-wheelers etc.
    - The 'Shared Transport Committee' will be in charge of fixing the fares across shared modes and the number of permits
- **Financing reforms-Creating a 'Bengaluru Urban Transport Fund (BUTF)' under the UMTA**
- The financing available for provision of public transport needs to be increased to improve the public transport service quality cater to the increasing population and travel needs of users. Hence the BUTF will be created and will be administered by the UMTA, in addition to the SUTF currently administered by DULT.
- BUTF will ensure funding of sustainable transport initiatives within the state.
    - This fund will receive annual budgetary allocation similar to the funds allocated to road building programs
    - Additional avenues of financing will be initiated to mobilise the required resources including: budgetary allocations, value capture financing, congestion pricing and other taxation measures. 'Namma Metro' of Bengaluru has already initiated value capture financing to fund its expansion in the future
    - The allocation of these funds will be used to provide affordable public transport services on routes which are not financial feasible based on ticketing revenue
    - Further, this fund will also be replenished through a variety of alternative sources of funding listed below:

i) Parking fees from private vehicles

- DULT of GoK has already developed a parking policy for all urban areas that calls for reduction in on-street parking of Cars and Two-wheelers and pricing them according to the market value of the space they occupy. An action plan for implementation will now be prepared
- This parking policy will now be implemented across the state and the funds generated from the parking fee will be allocated to the public transport fund

ii) Green cess on polluting vehicles

- Karnataka will introduce a Green cess on heavily polluting passenger and goods vehicles and will divert those funds to the public transport fund

iii) Congestion pricing system to discourage private vehicles

- GoK will introduce a congestion pricing system on private vehicles to charge vehicles according to their road space requirements and emission impacts
- Locations for area and line pricing of vehicles have already been identified by DULT in a study conducted in 2015, with assistance from JICA and MSI Singapore. These will be taken up for implementation in a phased manner
- The roadmap for tariff setting and the various pricing technologies will be explored based on consultations with industry representatives
- The funds raised from the congestion pricing will be used to replenish the public transport fund which will further be used for the necessary public transport service improvements in the areas where congestion pricing is implemented

iv) Vehicle Taxation based on their congestion and pollution impacts

- The current taxation systems charges cars and two-wheelers lower than public transport systems, which is contrary to the shared mobility principles
- State will review the taxation system such that each vehicle is taxed according to their road-space requirements and the emissions. For eg. a bus occupies 3 times the space of a car but carries 20 times the number of passengers. The taxation system will be re-calibrated to reflect the ‘Polluter pays’ concepts

v) Corporate Social Responsibility (CSR) proceeds for public transport

- State will look to raise additional funds for public transport through Philanthropic foundations and CSR sources from corporates like Infosys, Wipro etc.

Utilisation of SUTF and BUTF

- State will design a ‘Public Transport Service Obligation’ across rural and urban Karnataka and allocate public transport fund according to the service obligations

- A state-level planning activity will be taken up to estimate the existing and future travel needs in Karnataka and the public transport services required to cater to these travel needs.

  i) The outcomes from this planning exercise will inform the future allocations of the public transport fund and the number of commercial passenger vehicle permits to be issued in the state

- The modes of mobility required for these demands i.e. rail, bus, on-demand mobility etc. will be identified according to demand and affordability criteria
- PTSOs will then be issued by the Transport Department to operators providing the required service. Within the allocated services, the loss making one's swill be subsidised through the public transport fund. This will help bring in more-transparency into the public transport fund allocation and for providing affordable transport services in low-demand areas. This will also address the current losses incurred by public transport in rural areas
- Further, the total number of permits issued for private Stage and Contract carriage operators will be determined based on the availability of STU services. For eg. in areas where STUs already have adequate PTSCs, lower number of permits will be issued, while areas with lower existing services will offer more permits

Action Plan

- Create Public Transport Fund for Bengaluru within the next six months
- Initiate parking pricing and congestion pricing on high-dense/ highly congested corridors within the next one year

Conclusions

Government of Karnataka welcomes NITI Aayog's efforts on transformative mobility. State has constituted the 'Karnataka State Task Force for Transformative Mobility' to develop an integrated transport strategy across various Government departments and modes of mobility. The task force identified a two-pronged approach to transform the transport sector in Karnataka i.e.

i) To address the traditional challenges like lack of integrated planning and governance, inadequate public transport and Non-Motorise Transport (NMT) infrastructure and services, inadequate financing for sustainable transport etc.

ii) To harness opportunities offered by 'New Mobility' solutions like electric mobility, on-demand mobility, intelligent transport solutions to enhance sustainable transport solutions like public transport and street infrastructure

The transformative mobility strategy presented above balances these two challenges and presents our priority actions against various thematic areas identified by NITI Aayog i.e. Public transport, Share

mobility, Rural connectivity, Transit oriented development, Non-motorised transport, Electric mobility and Intelligent transport systems. Government of Karnataka has already initiated multiple efforts under each of these thematic areas and is looking forward to implement more solutions as listed above. Further, GoK urges NITI Aayog to also take cognisance of the historic institutional, financing and capacity challenges faced by states while preparing the transformative mobility strategy for India.

We look forward to your feedback on the strategy and guidance on the way forward for collaboration with NITI Aayog and other states in implementing it.

Any other relevant information

This document is a combined effort of the State Task Force on transformative mobility, senior officials from various departments in charge of mobility including State Transport Authority, Banglore Metro Rail Corporation Ltd. (BMRCL), Karnataka State Road Transport Corporation (KSRTC), Banglore Metropolitan Transport Corporation (BMTC), Directorate of Urban Land Transport (DULT), Traffic police, Urban Development Department (UDD) with technical inputs from Mr. Ravi Gadepalli of the International Association of Public Transport (UITP)-India.

Kerala

Framework for State Mobility Strategy

1. Introduction of the State / UT *(Not more than 500 words)* - (Basic Information- Geography, Population, Urbanisation, Density, Number of Vehicles (mode wise) etc.)

Kerala an introduction

Kerala is a small state having an area of 38,864 sq. km., roughly the size of Switzerland, tucked away in the south west corner of India. It occupies only 1.18 percent of the total area of India but is home to 2.76% of the total population of the country which was 3.10 percent during the 2001 census. As per the 2011 Census Kerala has a population of 33.3 Million. With a population density of 859 persons per km², its land is three times as densely settled as the rest of India. However, Kerala's population growth rate is far lower than the national average. The state is separated from the rest of the peninsula by natural geographic boundaries. Kerala may be divided into three geographical regions (1) high land (2) mid land and (3) low land.
Kerala ranks highest in India with respect to social development indices such as elimination of poverty, primary education and healthcare. Kerala has a Human Development Index of 0.79, which is very high and the highest in India. Kerala also has the highest literacy rates among all Indian states at 98.9%, and a life expectancy of 74 years which is among the highest in the country.

Urbanization in Kerala

Kerala has a state-wide rural urban continuum. According to the 2011 census, three of Kerala's cities feature in the 20 largest urban settlements in India. The 2011 Census shows that Kerala witnessed the highest level of urbanisation 47.71% as against the national average of 31.16% during 2001-11, with a growth of 83.20% over the previous decade. Kerala is experiencing urban spread rather than concentration, which is both a challenge and opportunity.

Mobility in Kerala

There is continuous and mass movement of people and goods between rural and urban area. Therefore, there is a pressing demand to bridge the gap in public transport between the same. The state has witnesses an exponential growth in vehicles with over 10 million vehicles at present. The annual growth rate of vehicles is 10% and the number of motor vehicles per 1,000 population in the state is 305 while that of the country is 18. Road fatalities cause 4,131 deaths & 42,671 Injuries.

Transport infrastructure of the state consists of 2.19 lakh km of road, 1,588 km of railways, 1687 km of inland waterways and 18 ports. Roads play a prominent role in public transportation over other modes of transportation owing to the geographic peculiarities. Kerala has a total fleet of 25,449 buses; of which 19,496 are private buses (77 per cent) and 5,953 are KSRTC buses (23 per cent). Private buses dominate transport in all districts of Kerala except Thiruvananthapuram. The State has a rail network of 1,257 km route length with a total track length of 1,588 km, operating under the control of Palakkad and Thiruvananthapuram Railway Divisions. In Kerala, there are many water bodies, including rivers, lakes, estuaries, backwaters etc. These provide a basis for the inland water transport system which has a length of 1,895 km. According to Census 2011, bus and train network, meets the transport requirements of 31.3% of the workforce engaged in industry and services (that is excluding agriculture and domestic workers) in Kerala whereas the national average is 14%, of which bus transport carries 28.5%.

2. Vision for Transformative Mobility in your State/UT

The Kerala Vision to Transform Mobility in the State is ***Connected, Safe and Energy Efficient public transportation system.***

3. Situational /SWOT analysis of the existing Mobility scenario in the State / UT *(Not more than 1500 words)*

i. Review of existing transport systems (road, rail, air, waterways) for urban and rural areas (with focus on public transport)

Road transport conveys majority of trips in the state. Road density in the State is 528.8 Km/100 sq.km which is higher than the national average. According to state disaster management officials, more than 10,000 kilometers of roads and bridges have been damaged due to the floods in August, 2018. The most important challenge in the road sector involves building all weather roads connecting each and every village.
Due to the lack of a common code for building of road infrastructure in rural and urban areas of Kerala, the built infrastructure lacks sufficient facilities for pedestrians, cyclists and other non-motorised road users.

The total railway route in the state has a length of around 1300 Km and covers 13 railway routes. The Railway Divisions at Thiruvananthapuram, Palakkad and Madurai jointly carry out railway operations in Kerala. Although there is high potential of utilising existing rail infrastructure for suburban transport, the resource hasn't been tapped to its potential.

The state has 44 rivers of which 41 are navigable. Coastal and inland water transport which were the backbone of passenger and freight traffic initially have not been developed to suit the rapid urbanization and motorization. Currently, Water Metro in city of Kochi is upgrading inland water transportation. Other cities such as Alappuzha, Kollam, Kasargod, etc also may benefit from the same. It is to be lauded that Water Metro is pursuing electric technology for the boats which will reduce pollution through emissions.

Public transport in the state is reliant majorly on buses of which private buses are around 14,500 in number whereas, public buses are around 5,700. The number of private buses has plummeted from 25,000 a decade ago to the present 14,500. It is reported that bus operators are introducing mini buses and those with lesser passenger capacity to reduce operational expenses, further defeating the cause of public transport. Also, public alleges private bus operators of straying away from the code of conduct due to instances of rash driving, abrupt cancelling of trips, etc.

Bus operators cite the steep increase in operational cost and paucity of good drivers as a reason for buses surrendering their permits. Also, it is observed that existing operators prefer to operate in cities and major towns, leaving the suburbs and hilly areas without adequate public transport. The loss of revenue is also due to former where buses clamour to run on profit making city routes which are getting saturated. There are policy limitations for rationalisation of the routes and creating hub and spoke model in cities.

ii. Identifying the Opportunities that exist in the State/UT

The state is on the verge of passage of the Unified Metropolitan Transit Authority legislation. Once the legislation is passed, the first MTA would be set up in Kochi. This is an opportunity to bring in much needed innovation in the mobility sector. The MTA Bill would ease the process of seamless transportation in the city and make multi modal transportation a reality.

The state has taken steps to transition to electric mobility and has already prepared a policy for the same. The transition to EVs been triggered by the commitment to promote shared

mobility and clean transportation. It would balance the peak and off-peak power demand for the electric energy from the state owned KSEBL. EVs would vastly improve operational efficiency and savings for the public bus agency, KSRTC as well as boost hardware and software manufacturing in the State. Transport being a major contributor to air pollution, EVs would drastically reduce pollution from fossil fuels.

At the pace the state is urbanizing, there is a huge push towards innovations in the mobility sector through technology and data. We are witnessing it in the forms of start-ups like car/ bike sharing apps, docked/ dockless bicycle sharing, journey planners, smart cards, etc. Such advancements are a way forward for the future of transportation. Shaped well, the strategies may be used to wean away users from privatised modes of transport to shared and connected public transport, thereby reducing pollution and congestion in cities.

iii. Identifying the challenges & issues related to Mobility in your State/UT (including manpower constraints and regulatory issues)

1. The policy regulations which limit the number of buses and routes plying in the city
2. Regulatory issues that limit route rationalisation of various private and public routes
3. The policy hurdles for mini and midi buses to ply in narrow and low intensity routes
4. Grid improvement for electric vehicles
5. Incentivising electric vehicles, especially in the IPT and PT sector such as autorickshaws, private buses, etc.
6. Regulatory issues for shared public transport in cabs, auto rickshaws.
7. Stage carrier vs contract carriages

4. Objectives for Mobility at the State level *(Not more than 100 words)*

The Honourable Governor of Kerala during his Policy Address in 2017, announced that the Government intends to set up Metropolitan Transport Authorities in Kerala with an aim to provide common command and control systems for transport planning, scheduling operations and integrating various modes. As a pilot project it was announced that the 'Integrated Public Transport Policy' will be introduced in Kochi. There is a paradigm shift towards public transport, with strengthened policies and investment, and formal systems of high quality and capacities in the state.

The objectives formulated by the state government to transform mobility in the state are:

- Citizen centric transport infrastructure to be created
- Provide safe and comfortable public transport to all citizens across the state
- Reduce road crashes by 50%
- Reduce carbon emissions
- Foster Inter modal integration
- Integrating Landuse planning along with Transport Planning
- Setting up of Unified Metropolitan Transport Authorities

5. Identifying key Strategic levers for transforming mobility *(Not more than 2000 words)*

xv. Expanding / Enhancing the network infrastructure for various modes (road, rail, air, waterways)

Completion of networks is of utmost importance. It helps to connect people to jobs, education, healthcare, recreation.

xvi. Shared Mobility (including public transport systems, taxis, 3 wheeler autos etc)

Policy level interventions which would make shared transport implementable around mass transit as last mile connectivity. Electric vehicles are being prioritised for last mile connectivity.

xvii. Intelligent Transport Solutions and Digitization

In transport, digitalisation can significantly improve traffic and transport management through more accurate information on traffic and infrastructure conditions and on the location of vehicles and/or goods. Kerala has identified the need for Intelligent Transport Systems and as a start has made policy provisions in the form of section 151A in the Motor Vehicle Rules to reflect the installation of prescribed GPS devices in all passenger transport vehicles, buses and taxis. Also, Kochi in the process of setting up Operation Control Centre which would be funded by the Cochin Smart Mission Ltd. (CSML) which would collate real time information from various modes and analyse the same for seamless transportation. The Command and Control Centre would be able to identify traffic and transport requirements in a dynamic manner.

xviii. Non-motorized Transport / Pedestrian facilities

The state in collaboration with think tank will develop standards for roads and streets in Kerala which would lay out the design standards required for non-motorised transport (NMT) and pedestrian infrastructure. Such standardisation of roads would improve safety of pedestrians and NMT users as well as create universally accessible infrastructure thus improving inclusivity.

xix. Inclusive Mobility

Smart cards would be employed in such a manner that a telescopic fare structure is achieved and multi modal transportation is made seamless. Infrastructure would be made universally accessible and inclusive.

xx. Regional Connectivity

With its typical linear development, regional coactivity is of utmost importance in Kerala. KSRTC, the state run bus agency is responsible for providing regional connectivity across the state along with inter-state connectivity. Private bus operators, rail and air travel also play a role in fostering connectivity on a regional level. Other modes of travel like Bus Rapid Transit, Light Rail Transit, etc are also being explored for better connectivity between districts. The state strategy relies heavily on creating intermodal transport network with inclusion of waterways, roads & railways.

xxi. Transport Oriented Planning

Mass transport would be planned in collaboration with landuse planning principles. Transit oriented development would be made mandatory. A TOD policy will be framed for the state with the help of think tank. Land value capture methods would be promoted as a financing tool for fostering more financially viable transit-oriented development projects.

xxii. Freight Movement

Freight movement would be streamlined with the help of planned freight hubs. As a pilot, Kochi is to develop feasibility studies for freight hubs in the city. Water transport potential would be harnessed for better management of freight using clean energy.

xxiii. Safety

Road fatalities would be reduced by 50% using a slew of measures including enforcement, education, engineering and better emergency response

xxiv. Mobility Financing & Entrepreneurship

Innovative models of financing mobility will be pursued through intra governmental agencies, multi-lateral funding agencies, NGOs, CSR funding, etc. Land value capture would also be used a method to finance projects as well as ease land acquisition for mobility projects. Hackathons, boot camps and mobility accelerators would also play a part in bringing in new technologies.

xxv. Rural Mobility & Farm Logistics

The state is planning to connect northern and southern regions of the state through high speed rail which would bridge the gap between areas. The alignment would also be identified such that agriculture and related industry is developed along the corridor. The same concept would also be encouraged in the north-south water connectivity project with focus on tourism, fishing activities and freight management.

xxvi. R&D and Advanced Manufacturing

The focus on home grown technology and manufacturing would be highlighted in every initiative.

xxvii. Employment & Skilling

Capacity building of existing workforce with the help of think tanks would be made mandatory for all mobility initiatives.

xxviii. Cyber/ Data Security & Safety Mechanisms

Data capture and analysis is expected to play a major part in all mobility initiatives in the state. It is also expected that open data policy would be part of the philosophy of mobility in the state to improve efficiency with the use of technology. It will all be under a framework of tight data security and safety mechanisms.

xxix. Electric Mobility

A State Level Task Force (SLTF) has been constituted for preparing a road map for E-Mobility. The Key Expert Members of the task force are:

1. Dr Ashok Jhunjhunwala , Principal Advisor, Minister of Railways, GoI
   Professor IIT Madras (on sabbatical)
2. Mr Reji Pillai, President - India Smart Grid Forum (PPP ,GoI), Chairman – Global Smart Grid Federation
3. Mr Sajid Mubashir, Scientist "G", Department of S&T, GoI

The SLTF has convened meetings with the Chief Minister, Chief Secretary and having regular coordination meetings since October, 2017. The state has also prepared an Electric Vehicle Policy which focusses on:

- Energy-efficiency of Electric Vehicles
- Battery eco-system
- Charging and swapping infrastructure
- Demand generation

A roadmap for electric vehicle policy for the state would be prepared by the think tank. A pilot roadmap for Kochi will also be prepared. Various categories of vehicles are targeted for transition to EV. Discussions with manufacturers in the Indian market have commenced.

State run KSEBL to create charging infrastructure including battery for the entire network. Selection of battery operator is on the anvil. An E-Car sharing project on the cards so as to familiarize modern EVs to general public and encourage take up of the same. Currently, six EVs have been procured for short-term basis.

The State Government will issue new permits only to Electric autos in 3 districts which would be limited to 2000 new permits per district. Existing owners to be given an option to shift to e-auto to avail incentives as per EV Policy. Mandatory shifting on renewal of registration will be implemented and there would be colour coding and GREEN recognition (being planned).

Water transport will also be incentivised to shift to electric energy from fossil fuels. Water Metro has already received bids for electric boats. Homegrown start up (NAVALT – Aditya) to be supported through incentivisation.

Also, bus based public transport will also be transitioned to electric. KSRTC to convert one-third of its fleet to electric in five years. City transport in three districts will be selected as pilot. A wet lease model would be adopted. 9 m. AC buses to be accepted as standard while viability of the E-fleet would be established through pilot runs in all three districts. Plans for running ten electric buses on wet lease for the Munnar Neelakurunji Festival at Iravikulam National park are afoot. Fifty electric buses to be run between Neelakkal to Pamba during Sabarimala Festival.

Creation of E Mobility Zones have also been planned to create initial demonstration hubs at:

i. Tourist villages/spots (Kovalam, Munnar etc)
ii. Technology hubs (Technopark/Infopark) – ebikes, e scooters, e-autos
iii. Districts of Trivandrum /Kochi and Kozhikode
iv. Last mile connectivity for urban transportation networks (eg. KMRL)

The various support schemes for early adoption are:

i. Incentives under the scheme for promotion of EVs
ii. Other fiscal incentives on EVs such as state tax breaks, road tax exemptions, and free permits to fleet drivers.
iii. Non-fiscal incentives such as exemption from toll charges, free parking, etc.
iv. Subsidized electricity with tariff between Rs. 4.5-5.5 per unit for EV charging stations.
v. KSEBL to setup initial charging and swapping stations across vehicle segments. (The bus charging stations could be in the depots)

Strategic initiatives for transition to electric vehicle are:

i. Addressing the viability gap for buses and Government fleet (if any)
ii. Creating adequate charging infrastructure that are interoperable with several models of EVs
iii. Promotion of local manufacturing
iv. Awareness creation and promotion of shared mobility
v. Human capacity building and re-skilling

There are various projects and promotion models that have been identified for Capacity Building on Electric Vehicles:

i. Centre of Excellence for Electric and Autonomous Vehicles:
ii. Curriculum updates for EVs and AVs
iii. Skilling Programs for E V & AV industry
iv. Connected and Autonomous vehicle testing corridor

State Action Plan

Interventions	Key Action Areas	Implementing Agencies	Deadline
5. Policy approval by Council	Policy discussions	Department of Transport	August 2018
6. RFP by KSEBL	Battery and Charging Infra	KSEB	Sept 2018
7. EoI by Transport	empanelment of manufacturers	Department of Transport, Legal and Finance	Sept 2018
8. Adoption by various stakeholders	Follow up with: i. KSRTC ii. Tourism iii. Industries iv. MTA?	Coordinating body: Department of Transport KSRTC, Tourism Department, Industries Department	October 2018
9. Setting up of CoEs	Capacity Building	Transport Department, Research bodies	October 2018
10. Roadmap for electric vehicle policy	Implementation plan for EV and charging/ battery swapping infrastructure	Transport Department, Research bodies	Nov 2018

Conclusion

The state of Kerala is on the verge of a revolution in the mobility sector. The Metropolitan Transport Authority Bill once made, a legislation will be a game changer in urban mobility. Electric Vehicle policy will help create a framework for cleaner technologies to enter our vehicular fleet and reduce carbon emissions. It will also enable better infrastructure and promote public transport. The slew of measures reported in this paper will foster the development of connected shared public transport in the state.

Lakshadweep

- The Vision of the Administration of Lakshadweep is to Shape a modern, efficient, economical and safe transportation system that balance the needs of the economy, society and eco friendly environment and transform Lakshadweep Islands as 100% Accident free, Pollution free and the most lovable living space in the country and positioning these Islands as a visible global brand in Eco- friendly tourist destination by 2020.
- Union Territory of Lakshadweep, the smallest territory in Indian Union lays scattered in the Arabian Sea. Lakshadweep is a group of 36 tiny coral islands and islets randomly scattered in the Arabian Sea at a distance of about 287 to 483 km off the west coast of Kerala. These islands are geographically isolated from mainland as well as from one another by deep sea and are at an average distance of 60 to 300 Kms. These islands are very small in land area having 0.01 to 4.84 square Kms. Out of 36 islands 10 islands are inhabited. Total population 64,429. There are only small roads within the inhabited islands. The total length of roads in all of these 10 islands is only 206 kilometers with a width of 3 meters. There is no National Highways or State Highways or major roads in these islands.

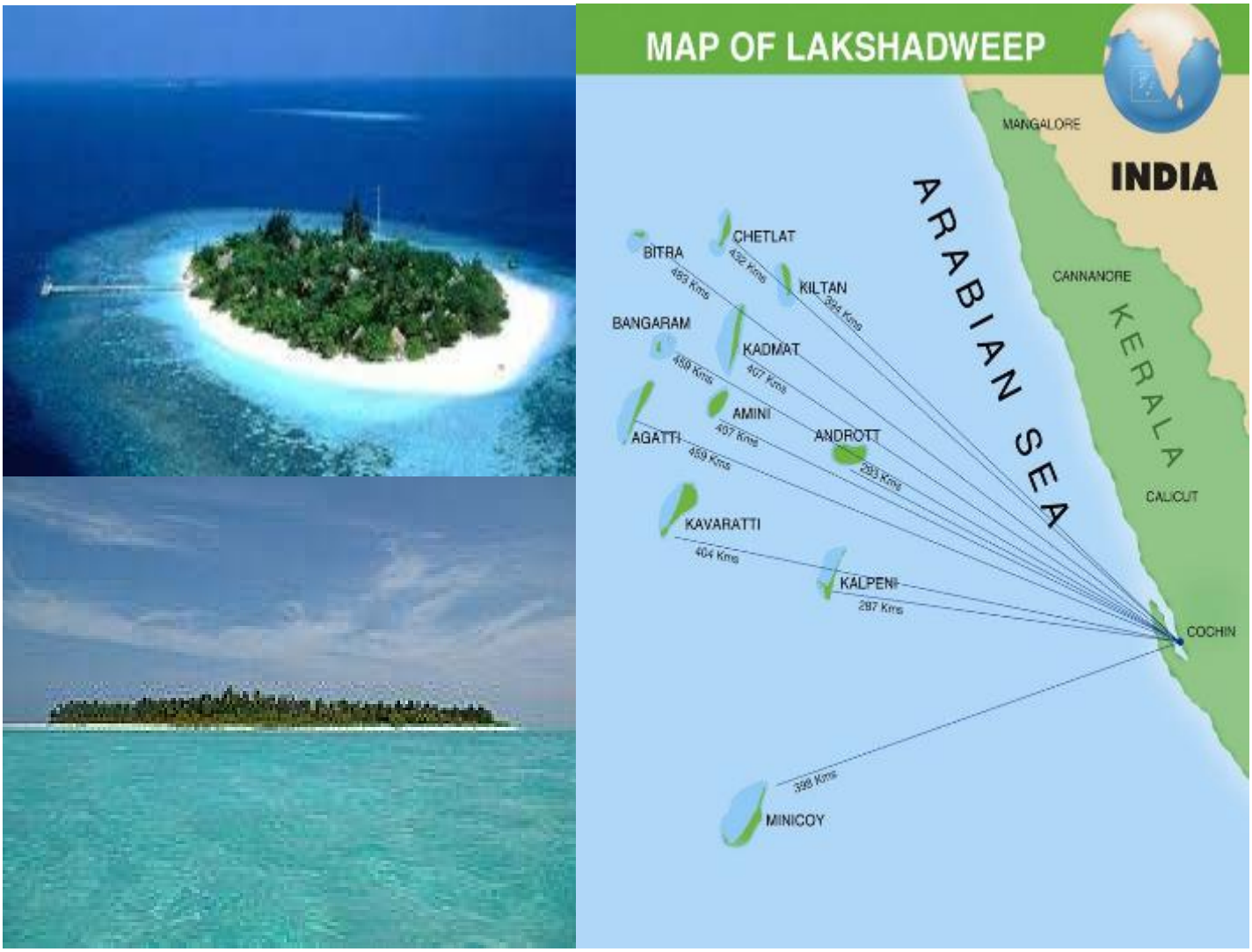


Table 2: Area and population of Lakshadweep

Sl. No.	Name of Island	Area (Sq.Kms)	Population (2011 Census)
1	Agatti	3.84	7560
2.	Amini	2.60	7656
3.	Androtti	4.90	11191
4.	Bitra	0.10	271
5.	Chetlat	1.40	2345
6.	Kadmat	3.20	5389
7	Kalpeni	2.79	4419
8.	Kavaratti	4.22	11221
9.	Kiltan	2.20	3946
10.	Minicoy	4.80	10447

Connectivity between Mainland and Island to Island

- Each Island in the Union Territory of Lakshadweep is an independent entity by itself. The available means to reach the islands are
  - By Ship from Kochi, Calicut and Mangalore
  - By Air from Kochi to Agatti

The Lakshadweep Administration operates Passenger ships mostly from Kochi to the islands and on certain occasions from Calicut and Mangalore.

Table 3: The Details of the available fleet of Passenger ships

Name of Vessel	Year built	Passenger Capacity		Total	Cargo Capacity (Tonnes)
		Cabin/ VIP Class	Seat/ bunk		
M.V.Kavaratti	2007	400	300	700	160
M.V.Arabian Sea	2009	50	200	250	100
M.V.Lakshadweep Sea	2010	50	200	250	100
M.V.Corals	2014	50	350	400	250
M.V.Lagoons	2015	50	350	400	250
M.V.Amindivi (fair-weather)	2000	0	150	150	25
M.V.Minicoy (fair-weather)	2000	0	150	150	25

Inter-Island connectivity

- High Speed Crafts are operated for inter island Passenger movement during the fair season.
- The crafts with 150 pax capacity, on rare occasions and on emergency operates from island to mainland also.

Table 4 Details of available High Speed Crafts

Name of Vessel	Year built	Passenger Capacity	Total	Cargo Capacity (Tonnes)
		Seat		
Valiyapani	2007	150	150	Nil
Cheriyapani	2007	150	150	Nil
Parali	2007	150	150	Nil
Blue Marline	2007	50	50	Nil
Black Marline	2007	50	50	Nil
Skip Jack	2007	50	50	Nil

Viringili	2006	15	15	Nil
Bangaram	2006	20	20	Nil

Helicopter facility – air ambulance

- There are 3 Pawan Hans Helicopters available with Lakshadweep Administration
- These are mainly used for evacuating serious patients from Islands mainland for life saving as Air Ambulance
- During monsoon period ie; from mid May to mid September, when the speed crafts do not operate and passenger ship voyages are limited, they are used for inter Island connectivity.

Connectivity to Lakshadweep (cargo)

- Lakshadweep do not have any agriculture produce except Coconut and Fish. All the items required for the people are brought from the neighbouring states of Kerala and Mangalore.
- Cargo Barges available with the administration operates between the islands and mainland ports.
- During the fair season Motor Sailing Vessels are also operated between islands and mainland.

Table 5: Details of Cargo Barges operating between the islands and mainland

Name of vessel	Built year	Cargo capacity (in tonnes)	Cargo Type
MV Ubaidulla	1993	600 MT	General Cargo
MV Thinnakara	1993	600 MT	General Cargo
MV Laccadives	1995	600 MT	General Cargo
MV Cheriyam	1997	600 MT	General Cargo
MV Eli Kalpeni	2012	2000 Cylinder	LPG Cyclinder
MV Kodithala	2013	150 MT	Oil carrier
MV Sagar Samrat	2016	800 MT	General Cargo
MV Yuvaraj	2016	800 MT	General Cargo

Difficulty faced in sea transportation

- There are no ports where the ships can berth in any of the islands
- The embarkation and disembarkation exercised are carried out in open sea. This is not only an inconvenience but at times it could be life threatening

- During the four months of south west monsoon, from mid May to mid September, the seas are heavily rough and very difficult to operate in the open sea.
    - Establishment of eastern side jetties could be a solution to this major problem
    - At present there are eastern Side jetties in the islands of Kavaratti, Agatti, Amini and Minicoy.
    - Eastern side jetties to be established in all the remaining islands

Road Transport

- There are only small roads within the inhabited islands. The total length of roads in all of these 10 islands is only 206 kilometers with a width of 3 meters. There are no National Highways or State Highways or major roads in these islands
- In the absence of road connectivity between mainland and islands as well as inter island, no vehicle can enter or exit from one island to another or to and from mainland.
- The size of the islands both inhabited as well as uninhabited are very small ranging from 4.84 Sq Km to 0.1 Sq Km.
- Due to the limited land availability there is no scope for expansion/widening of existing roads. Inspite of this limitation the number of vehicles being operated in the islands are growing rapidly.

Table 6: Area and Road infrastructure

Sl. No.	Name of Island	Area (Sq.Kms)	Road Availability in Kms
1	Agatti	3.84	18.55
2.	Amini	2.60	23.80
3.	Andrott	4.90	31.48
4.	Chetlat	1.40	6.30
5.	Kadmat	3.20	15.02
6	Kalpeni	2.79	30.18
7.	Kavaratti	4.22	35.99
8.	Kiltan	2.20	11.25
9.	Minicoy	4.80	33.67

Table 7: Availability of Vehicles & Road Infrastructure (Island wise)

Island	TWO Wheeler	THREE Wheeler	FOUR Wheeler	Total	Road availability
Kavaratti	3842	407	481	4730	35.99
Minicoy	2662	439	252	3353	33.67
Androth	2619	236	181	3036	31.48
Agathi	1662	102	115	1879	18.55
Kadmat	1009	105	143	1257	15.02
Amini	1117	157	190	1464	23.80
Kalpeni	1068	108	132	1308	30.18
Kiltan	542	72	82	696	11.25
Chetlat	315	12	43	370	6.3
Total	14836	1638	1619	18093	206.24

Peculiar conditions demand different solutions

- The Geography of the UT of Lakshadweep is different from other parts of the nation.
  - Each island is an independent entity by itself as there are no means for connectivity by road from mainland and from any other island.
  - The roads in the islands are narrow concreted paths with only 3 mtr width.
  - There is no scope for widening roads due to the inherent geographic conditions.
  - There do not exist a Public Transportation system or there do not exist a scope for it as the area of the islands is too small.

Strategy

- Due to the scarcity of land availability, the scope of widening the existing roads is quite limited as the living houses and buildings are constructed along the road sides and no free spaces are available. Therefore the following restriction shall be mandated
  - As far as possible the existing major and important roads shall be declared as one-way

- Pedestrian lane shall be constructed on all major roads.
- All bigger goods vehicles (Tractor & Tipper) shall be allowed to operate during night time from 10.00 PM to 6.00 AM only.

Facilities for visiting Tourists & floating population

To discourage the use of four wheelers and thereby reducing the traffic and paving way for a clean environment the following can be introduced:

- Promote bicycles as the potential substitute for the two and four wheelers for a better environment and healthy life.
- Encourage using bicycles for sight seeing the island
- Establish bicycle lending hubs in different points of the islands.
- Provide GPS enabled bicycles tracking
- Make available two wheelers on rental so that the unemployed youth will find an economic activity.
- Promotion of Eco-friendly vehicles
- E-Rikshaw Scheme: The Administration has a scheme for promoting eco friendly vehicles under which the department of Road Transport would provide 50% subsidy upto the limit of Rs.50,000/-

Strengthening of existing Road Infrastructure

- **Removal of road side hurdles**: There are many Coconut trees and other trees trespassed to road sides in many areas and this leads to many troubles for vehicle users. These trees & branches are to be removed and road sides are to be kept cleared from obstructions.
- **Clear visibility** shall be ensured throughout road length by clearing coconut trees/ other trees and branches spread over on the road.
- **Speed breakers** shall be constructed in all major/important junctions, turning points and at sharp curves with proper Signage.
- **Road Signage & Road markings** on all major/important roads shall be clearly marked with reflective paints.
- Improve **sight distances at curves and junctions** by removing all obstructions such as structures, trees, compound walls etc. and by enacting necessary land use control legislation.
- All **un-necessary hoardings and advertisements** along the road side obstructing the visibility and diverting the driver's attention shall be removed and cleared.
- **Straightening of Roads**: There are many sharp curves/bends on several parts of the roads in this Island, these curves/bends are to be straightened as far as possible subject to land availability
- **Repair/Re-surfing of Roads**: Many parts of roads are broken/ damaged and it needs to be repaired and re-surfed.
- **Repairing of road side Slabs & filling earth along the road side**: There are many slabs laid on the trenches along the road sides are broken or damaged and some are not properly fixed/laid and lying un-even level and it invites danger to the vehicle users and pedestrians.

These broken/damaged slabs are to be removed and new strengthened slabs to be laid on the trenches properly to enable to bear load of all types of vehicles and earth to be filled along the road side up to the road height to avoid slipping of pedestrians and vehicles into road side gutters

- **Convex Mirrors** to be fixed in all sharp curves/bends and black spots to ensure visibility of vehicles coming from opposite side
- **Yellow Flash Lighting** to be erected at all major junctions, intersections and other important road sides for giving caution of junction/intersection ahead.

Strengthening of Traffic Police and MVD and Improving Law Enforcement

- The Government would take steps to improve quality of enforcement to ensure effective and uniform implementation of safety laws.
- The steps would be undertaken to establish and strengthen the Training programmes for traffic police in effective law enforcement, use of modern equipments, and dealing with traffic law offenders.

Awareness/IEC activities

- **Road Safety Education** would be made part of the curriculum for enhancing road safety awareness at an early stage.
- Department of Road Transport and other agencies would be involved in developing school based road safety education progammes for school children.
- Production of education material for school children, teacher's guide and teacher training programmes are also to be undertaken.
- **Encouraging NGOs and other expert agencies** in spreading road safety messages and conduct road safety awareness campaigns to educate public on defensive driving and safe journey.
- Public Safety Campaign would be launched for mass education on the issues of unsafe behavioral elements of road safety such as not using helmet/ seatbelt, dangerous overtaking, over speeding, not observing central yellow marking etc.
- Publicity campaigns would be scientifically designed and investigative studies would be conducted to evaluate the impact of such campaigns.
- Road safety publicity campaigns will be used to propagate good road safety practices among the community. The Government would encourage all professionals associated with road design, road maintenance, traffic management, traffic enforcement etc. to attain adequate knowledge of road safety issues. Road safety community programs at Panchayat, school neighborhood area, work centers, etc. would be formulated and implemented.

Enforcement

- Strict enforcement shall be carried out against all traffic violations using IT based intelligent transport devices such as speed radar/cameras, GPS etc. and enhance penalty clauses and amount.

- Inspection & Certification (I&C) of transport vehicles shall be made compulsory by covering both safety & emission norms and link registration/insurance of vehicles with I&C.
- Strengthen the enforcement of speed limits through the use of appropriate technology like speed cameras.
- Ensure effective enforcement to check violation of basic safety requirements and drunken driving, and implement deterrent penal provisions.
- Appropriate use of technological measures like smart cards for issuance of license and Registration Certificates shall be made.
- Promote the establishment of an adequate number of properly equipped driving schools, Soft policing on first time traffic violators and educating them the type of violation and its impact of other road users.
- Hard policing and strict enforcement on habitual traffic violators with the help of ITS technologies such as surveillance cameras, interceptors and other advanced automated traffic control devices.
- Strategies should be evolved for sustained enforcement on over speed, rash driving, non-wearing of seat belt and helmet, using mobile phone while driving, drunken driving and other traffic rule violations.
- Setting up of Task Force/Traffic Police: As in other States/UTs, a separate section of force in Lakshadweep Police is to be set up specifically for controlling Traffic and conducting enforcement and to check traffic violation. Training may also be imparted to such police personnel.
- Installation of Speed check cameras: Speed check cameras to be installed to prevent over speeding and other traffic violations

CONTROL/LIMITATION OF VEHICLES

- There are 18000 odd vehicles registered in 9 Islands, however the road availability in all of these Islands is only 206 KM. Due to land scarcity there is no scope for road widening.
- However, nowadays there is a tendency of bringing very old and out dated four wheeler vehicles from main land to Lakshadweep Islands, especially tractors and tippers. This leads to road congestion and environmental pollution.
- Therefore a control/restriction is necessarily to be taken to stop the practice of bringing these types of obsolete vehicles by fixing the age limit to all categories of vehicles and fixing the size/ dimensions of the vehicles.
- Considering the road limitations, the size and age of different categories of vehicles are required to be prescribed for the convenience and smooth flow of traffic feasible to Island road condition as per the table:

Table 8: Maximum age of vehicles

Category of Vehicle	Age
Non Transport	20 years
Transport/Commercial	15 years

Table 9: Dimension of Different category Four wheeler vehicles

Class of vehicle	Length	Width
Passenger vehicle (car, jeep, van etc)	4 Meter	1.75 Meter
Goods carrier (LGV, LMV Tipper)	4 Meter	1.75 Meter
Bus (mini)	6 Meter	2.2 Meter

Exceptions:

Exceptions shall be allowed for construction equipment vehicles like crane, JCB etc. with movement restriction during day time as these category vehicles shall permit to use public road during odd hours from 10 PM to 6.00 AM only.

**However, the approval for the above has to be granted by the Central Government since the powers to do so is vested with Central Government Under Section 59 of MV Act, 1988

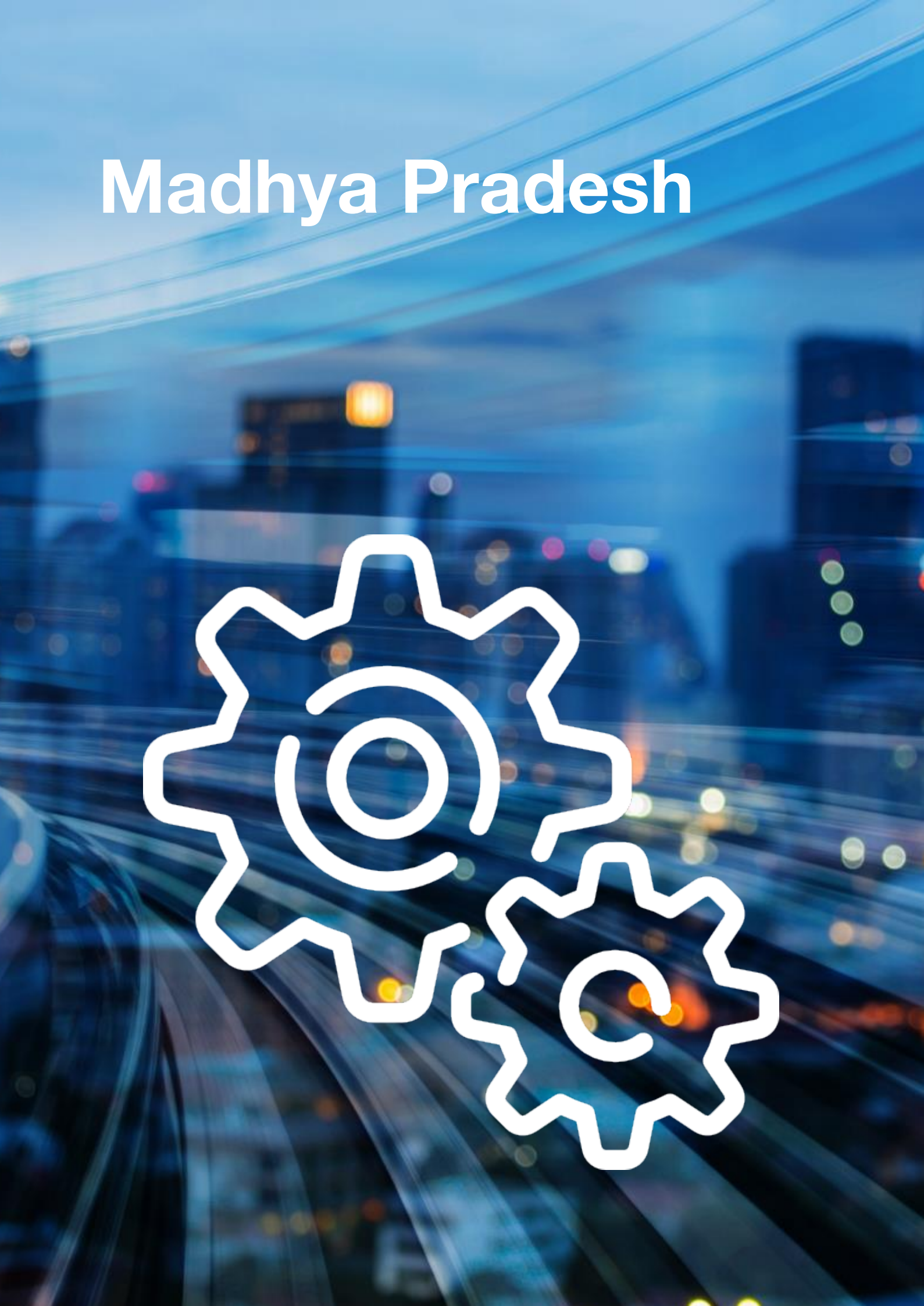
Promotion of Eco-friendly Vehicles

- Promotion of Eco-friendly vehicles: Lakshadweep is blessed with a pollution free atmosphere by nature. As a step towards to protect and betterment of environment and ecology usage of petrol/diesel vehicles has to be discouraged. Hence promotion of eco-friendly vehicles.
- **E-Rikshaw Scheme**: The Administration has a scheme for promoting eco vehicles under which the department of Road Transport would provide 50% subsidy upto the limit of Rs.50,000/-
- Administration shall provide financial assistance for procurement of Battery Operated Vehicles (BoV)/Electrical vehicles
    - Sufficient number of Charging Stations shall be installed
- Promotion of Bicycles:
    - Promote bicycles as the potential substitute for the two and four wheelers for a better environment and healthy life. .

Trauma Center

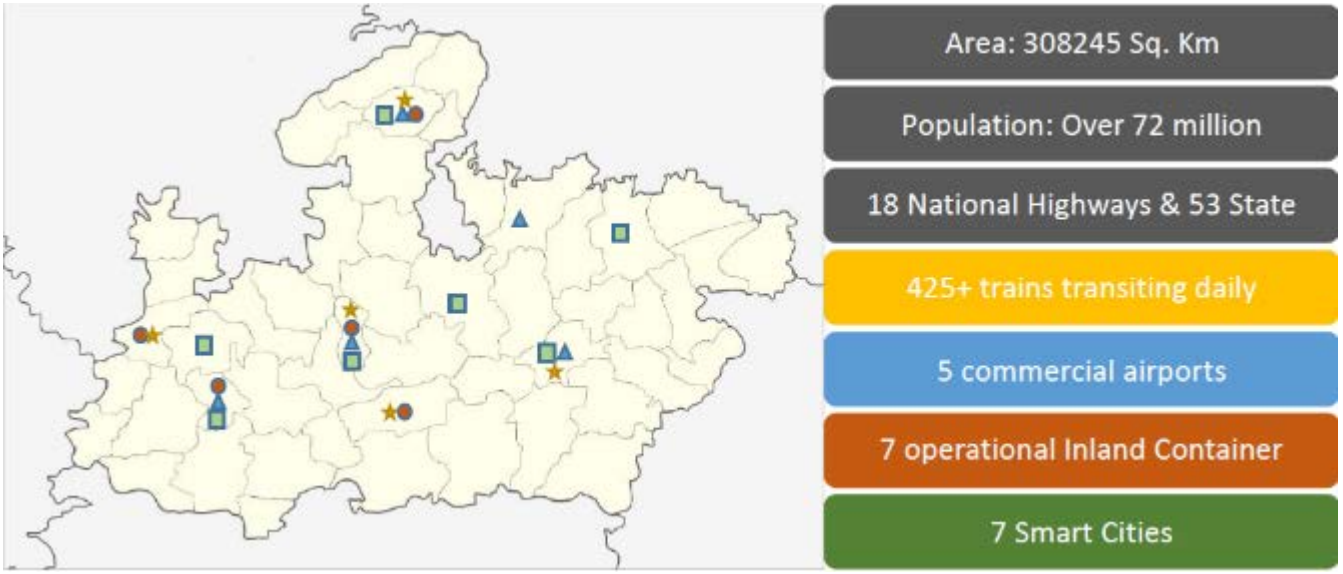
- Emergency Medical Assistance to Crash Victims
- The Government would strive to ensure that all persons involved in road accidents benefit from speedy and effective trauma care and management. Hospitals would be adequately equipped to provide for trauma care and rehabilitation.

Madhya Pradesh



Transforming mobility

Vision statement: By 2023, Madhya Pradesh will connect 90% of its villages through public transport services, supported by extensive community transport partnerships, which will strengthen the social and economic growth in the state. MP will lead the nation in deployment of solar based vehicle charging infrastructure, which will act as a catalyst for transition to green mobility in the state.



1. **Strategy for transforming mobility in MP**

Introduction

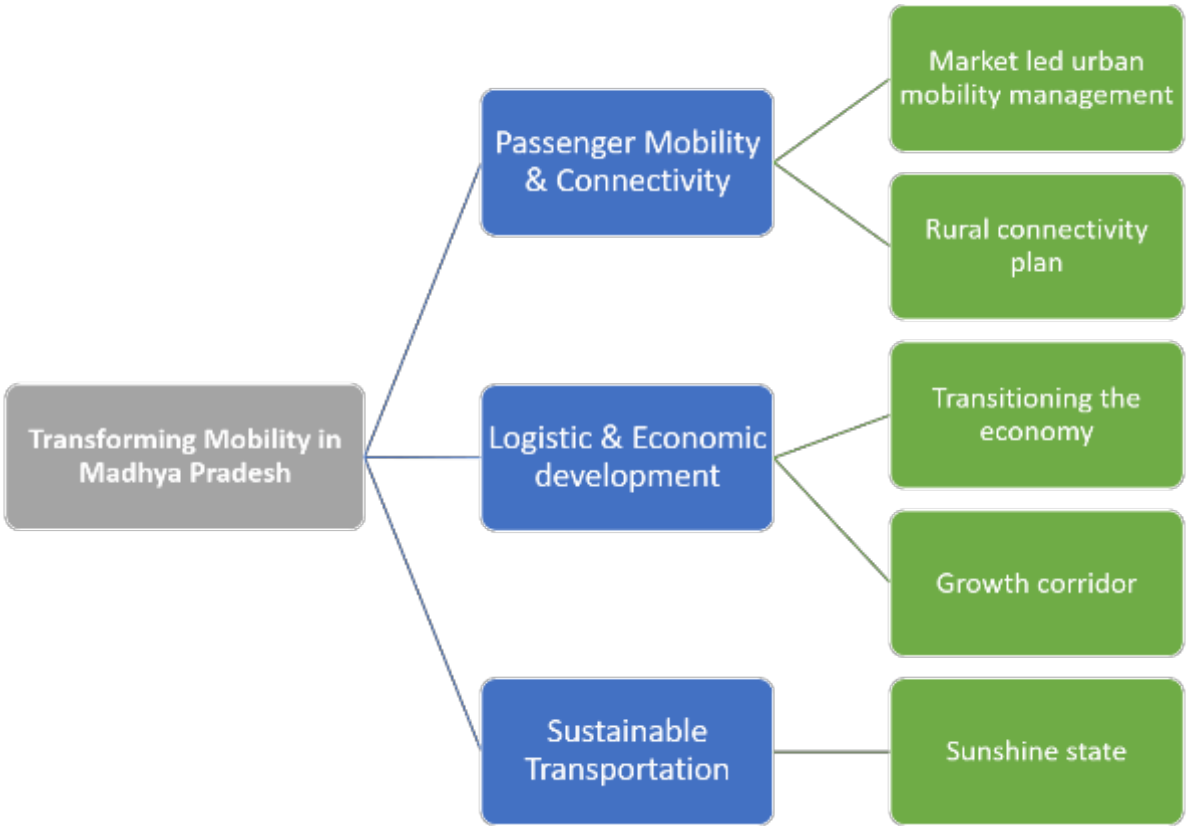
The purpose of this document is to holistically look at all components of mobility across all modes at all geographic levels. The document will lead in preparation of overall action plan to improve the current scenario for mobility of passenger and goods segments by doing different things as well as doing things differently. While the deliveries are spread-over different administrative set-up, a clear departmental and inter-governmental responsibility matrix, attached in the end of this document, will guide the overall roll-out in the state. This document also attempts to pull the proportional weight in extending the national cause in this area influencing social wellbeing.

Over last few years, there has been considerable stress in improving the transport related infrastructure in schemes like PM Gramin Sadak Yojyna, UDAAN, AMRUT etc. These schemes have benefited the state however much still needs to be done in order to make transportation the crucial axis for economic growth in the state. This change in the mobility scenario has to be in line with the state peculiarities present in the form of natural advantages/ disadvantages, earlier policy decisions, technological shifts and Citizen expectations.

Madhya Pradesh, despite the split of Chhattisgarh, is still a large state with a large number of national and state highways crossing its border due to its central location with in the country. This large road network connecting more than 50,000 village's, requires a large fleet of transport vehicles. While operating such a fleet with weak operational margins, may not be possible for any government entity, the early decision to wind-up the state road transport corporation and

n o n e o f alternatives options materializing, did have adverse impact on the state's economy and needs correction.

There are however broad opportunities that are now available to be leveraged for mobility. The improvement in electric vehicle technology using solar power as energy source is a high potential area for a sunshine state like Madhya Pradesh. Similarly advancement in monitoring systems can facilitate community driven shared mobility models which can assist the state's quest for rural mobility in an organized manner. Based on these state specifics, the strategic plan has been made in three segments. The **Passenger mobility & connectivity** segment has two levers of 'market led urban mobility management' and 'rural connectivity plan'. Similarly, **Logistics and economic development** segment has strategic level of 'transitioning the economy' and 'growth corridor in twin capital'. Finally harnessing the solar power "sunshine state" becomes the key lever for **sustainable transportation** segment. These levers and the strategy points have now been further detailed in the document.



a. **Passenger transportation & connectivity**

Market led Urban mobility management:

The state's decision of winding-up the Road Transport Corporation (RTC) opened up an opportunity for the private operators to play a larger role in intra and inter city transportation. In the hindsight, this move was based on the assumption of an active government regulation in different operational stages. However, under-investment in the transport monitoring technology by the state and lack of organized private transport operators has

left undesired scenario in the state. Recent efforts in streamlining the urban transport, by blending inter and intra-city routes are in the roll-out stage. This initiative is expected to address the connectivity of major intra- city routes; there however still remain a number of urban centric issues to be intricately weaved for lasting benefits. While the success of this model needs more data and time, it definitely provides an opportunity in transitioning to a more financially sustainable, user friendly and environmentally efficient set-up with support at policy, technology and governance level.

Policy support:

a. *Setting up State transport development & coordination body*: Transforming mobility involves multiple stakeholders working concurrently or in isolation for achievement of respective objectives. This requires close coordination and monitoring of works in order to ensure timely execution of tasks and avoid redundancy or flaw in the work. To achieve this, state shall constitute an empowered body with primary responsibility of harmonizing multi-departmental works for planning and execution of tasks envisioned. This body shall be empowered to take implementation decisions and also outline work details and timeline for respective departments. This state level authority shall comprise members from all related departments viz. Transport, UAD, PWD, Renewal energy and civil aviation departments.
b. *Revamping Permit system*: The current permit system is based on demand by operator with limited scope of denial in issuance of permit for sake of avoiding cluttered and fragmented services. The state therefore plans to amend the permit system by making relevant policy level changes wherein the new system of issuing permit shall be based on data. New permits shall be allotted keeping in view factors such as demand, route optimization, modal connectivity for long haul and last mile, nature of vehicle etc. The proposed system shall also ensure adherence to Green Policy (TBD) and other future mobility policies/initiatives that relates to public mass transportation. Similarly, the state will also review all the inter- state route permits for optimal service delivery.
c. *TOD & TDR*: The state cabinet has approved Transit Oriented Development (TOD) & Transfer Development Rights (TDR) policies thereby giving impetus to connected and efficient mobility. State further envisions incorporating TOD concept for all new development in the City Master Plan for cities with more than three lakh population. Besides, in current city landscape, it is planned to restrict vehicular movement around commercial areas this

being achieved by creating control points that shall have transit stops and parking zones/plazas with NMT and light public EV mobility to connect to the marketplace. The transit stops shall be strategically developed such that it enables connectivity with other Public transportation modes such as Metro and BRTs.

d. *Green Mobility*: State envisions bringing a policy addendum on vehicular emission, discarding of old vehicles and adoption of cleaner fuels in mobility.

Technology led Operations:

a. *Technology Platform*: The state envision to top up the existing technology set-up with a private partnership led platform which shall enable collection of operations data and process information for technology based enforcement and also aid mobility related applications like Passenger Information System, Passenger route planning service, Public Transport frequency management, new routes planning, traffic management, tariff calibration, online PUC data etc. using GPS & other technologies.
b. *Uplifting ITS*: Scaling up ITS platform to enable unified ticketing and payment solution which shall be applicable across all modes of urban transport. Going forward, agenda would be to integrate multi city urban transportation onto this system.
c. *Open data Policy*: In an era where data is a potential resource, state plans to create open data policy for its platforms so that private sector and start-up ecosystem can develop service innovation for continuous improvement.
d. *Safety*: Setting up integrated emergency response mechanism by unifying triggers and responders (fire, medic, and police) with the Integrated Command and Control Center. Furthermore, the state will invest in building automated drive testing tracks, automated fitness inspection & certification centers and actively use digital atlas for measuring roads motor-ability. Similarly, recent accident incidences involving vehicles related to educational institutions warrants a separate compliance and enforcement mechanism for all such vehicles at the state level.

Energizing Governance:

The state will play an active governance role in managing the services through private operators. This would entail significant alignment to technology supported and data backed operations management. A state-wise effort will be made to cover all forms of public transport, including para transit models like dedicated and shared auto's and unifying with ICCC for holistic planning and enforcement.

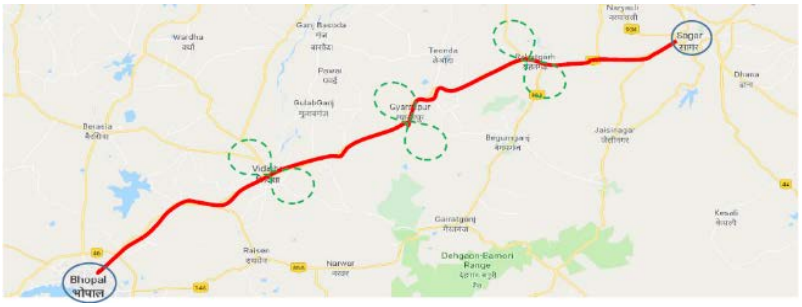
The role of bringing awareness on road safety, particularly among young drivers will be pushed as part of standard school/college education. Additionally, mandatory skills qualification testing on road use and rules will be pushed as an essential condition for getting new/renewal licenses or permits.

Strengthening of the departmental capabilities in efficient services delivery can never be over-emphasized. In this respect, MP will open more transport offices in tier 1 cities along with pursing more incorporation of 'same day services' under Guarantee to services Act and significantly improve the e-transport route of services for the citizens. All these changes will require a major push forward in the human capital. For this, the concerning departments will seek active engagement of the expert services and fresh lateral recruitments in these fields on both short and long term forms. The current staff will undergo a series of skills training to be comfortable in incorporating the new technology based role expansion in a focused manner.

Wide road network, less population density (Rural connectivity plan):

Madhya Pradesh manages the second largest state-wide road network in the country. This feat is coupled with thinly spread population, which makes passenger based transport planning very challenging in terms economic viability. These characteristics highly influence the private transport operator's adherence to the permit conditions like service area, pricing and operations frequency. While other states have predominantly used the RTC led model, MP has been served by a large number of private and local operators with over thirty thousand registered buses. While this decision may be financially prudent and ahead of time, there is a need to further develop the model to leverage the more synergistic transport operations involving intercity travel, en-route service extensions and community determined local transport operations. The renewed efforts will be bolstered by deepening of infrastructure and technology investments, more coordinated viable route-planning and distributed governance models based on available data.

Leveraging current Hub & Spoke model: The state has government regulated private operated Hub & Spoke model for intra & inter-city connectivity. This model is presently operational from twenty cities of the state with spokes identified from each of these cities for inter-city operations. State envisions leveraging present model by adding service loops at the interim halt-points on these routes. These service loops shall be local networks encompassing a 30kms radius that shall be a part of rural cluster network model (mentioned below). Besides, strategic planning of new clusters to be done such that it include coverage/stoppage of BHQs that are en-route and the rural cluster networks can be connected as service loops.



Services loops around halt points of spoke routes

Rural Cluster Network:

The state will model a cluster network model primarily in semi-urban to rural locations. Similar to the routes of Hub & Spoke model, a route of high travel frequency shall be identified. The difference shall be that of the maneuvering between the end points. While the urban centric model is more direct and short route between origin and destination points, the rural model is likely to be expansive with longer journey route that shall cater more number of en-route halt points. An effort will be made to streamline the existing granted permits to align to this model. The biggest change however will be in ensuring the governance influence that the technology through ITS services is likely to exert, in order to expand reach, have user friendly and predictability of services and ensure quality of operations.

District Transport Authority (DTA):

The state transport policy 2010 had reorganized the roles and authority at district level and called it District Transport Authority (DTA). It is currently empowered to identify routes, frequency & mode of transport and assign permits to private operators accordingly. Going forward, each rural route shall be planned indigenously but keeping modal connectivity and route merger in consideration, as per the rural cluster network (detailed above). The DTA shall do sustained monitoring of operations in order to enable perpetual planning of operations, infrastructure and other interventions. Existing operators shall be migrated to the new model to ensure there is less service redundancy and the routes are viable. Besides, vehicle shall be mandated to install enabling and safety devices such as fire fighters, GPS etc., drivers shall be screened for skills before allotting the permit. Government will have three pronged support system - One, developing infrastructure such as bus stops, parking stations, EV charging infrastructure etc.; Two, work out a financial requirements through various Viability Gap funding models wherever required; and three, integrate entire network with ICCC for perpetual planning and strengthening the modal connectivity.

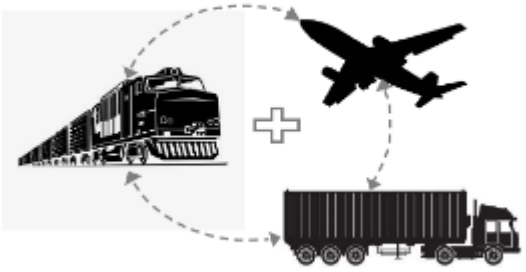
Mobility on micro rural routes:

The mobility requirement for very rural setting is more on travelling in vicinity (typically 5-10kms range) than a long haul travel. To cater the requirement of such routes, state will enable local communities (SHGs) to ply shared mobility options, preferably electric. This will usher a greener and cost effective travel by providing a model which can not only assist local travelling, but also create a sustained revenue flow to local communities. This eco-system shall be enabled via PMGPY.

Logistics & economic development

Transitioning the economy of MP

Industries have started seeing merit in setting up their base in MP in last few years; however the state still has a long way to bridge the industrial gap compared to some of the neighboring states. The state however commands central location for a continent sized country, which offers definite strategic advantage to be leveraged. This advantage needs a specialized infrastructure which can enable the private sector entities in their



operations. The state currently is underdeveloped in this area. The thinly developed rail network in the middle of the country leaves more expensive road transport as the only option for transportation of goods. The current logistics functions of the industries are likely to judge MP as a trans-shipment area, more attributed to cost and time drag to their operations, instead of being an enabler. The state will have to invest in spearheading the inter-modal connectivity options not only for assisting in the private entities operations, but also influence the logistics capabilities of the whole nation. MP will have to turbo-charge the railway expansions with strategic tie-up at the government level and find innovative solutions to cross support industries for better connectivity.

Empowering rail connectivity:

The state would prioritize strengthening of railway network on three major sub-regions in the state. These regions are of strategic importance from the context of supporting specific economic activities like oil seed production, horticulture production and minerals extraction. This expansion would also unleash high passenger movement demand and will benefit overall business sentiment. State shall work out cost benefit analysis and suitably push for strengthening of these routes through formation of SPV with railways for identified routes/projects, instead of following the railways natural yearly expansion planning model.

From Transport to Trade Corridor:

Madhya Pradesh is an agriculture prime state. To leverage and boost agri-produce economy, state envisions to broaden connectivity of logistics that deals with agri-produce. State envisions the development of logistics nodes comprising of warehouses, distribution centers and inter- modal connection capabilities, supported by trucking network for connecting warehouses. ICT based platform shall be developed to synchronize the goods movement information, for cost and transaction optimization, truck rest point planning and allied enabling services. Besides, expeditious implementation of automated tolls shall be undertaken. This expansion of infrastructure shall also densify other economic sectors in regions

Giving impetus to air connectivity:

While there are works done under GoI's schemes RCS & UDAAN, state envision to supplement these efforts with enabling factors unique to it. State plans to provide enabling platform to cross leverage the need for air connectivity to high value perishable horticulture produce, one of MP's key strength, via air freight model. Studies estimates 15-40% waste of horticulture produce between farm to fork. Even if 1% of total horticulture produce is channelized to high demand market via air, the cascading effect can be significant on horticulture as well as airlines business. Air cargo business itself can lead to airlines better operational viability and consequently improving air connectivity. State plans to develop cargo terminals with perishable goods handling capacity, at major airports.

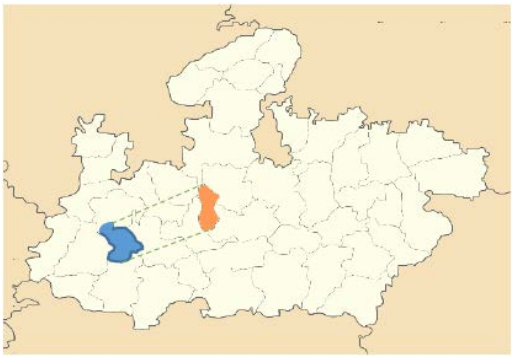
Last mile logistics:

The share of e-commerce/online based business volume is likely to expand rapidly in India in both Business to Business (B2B) and Business to Consumer (B2C) segments. This set-up flourishes on high speed door deliveries with a large variety of shipment sizes. While this is crucial for inventory cost management in B2B segment, it feeds the consumption led growth for any region in B2C segment. MP will develop the last mile logistics infrastructure in top 20 cities, which can reduce the current efforts in delivering the shipments at the door step, despite reaching the cities. The state will make required changes to facilitate the cargo handling capacities in transport hubs, incorporate changes in city entry regulations etc. for efficient deliveries.

Growth Corridor between twin capitals:

Madhya Pradesh is unique to host two capitals, wherein Bhopal is administrative capital of the state and Indore is the financial capital; with these cities located within 200km distance and has majority of prominent industrial and educational set-ups of the state. The two biggest industrial areas, Pithampur near Indore and Mandideep near Bhopal, can bring synergies by bridging the physical distance, for further industrial growth. The current setup also offers the two cites to leverage their connectivity strength's respectively. While Bhopal enjoys good rail transit for north-south corridor, Indore is developing a good air connection to different locations and has already made it to the top 20 busiest Airport in the country.

Bringing these two cities closer also opens a large market with a consolidated population of approximately four million. This can then be competitive and one of the top 10 population region in the country. This setup will renew the appeal for investments and service offerings by the private sector firms who currently look at 2 separate operations in two cities.



High speed connectivity:

These cities need to be connected via high-speed connection which can reduce current travel time by less than half. The rail network needs to be strengthened with direct non-stop shuttle services for day travelers. Similarly the road connectivity need to be further bolstered with more direct, expressway. These measures should enable high level of 'within a day job' travels among the twin cities. This new development should definitely cater to dedicated freight corridor to reduce the travel time for goods as well.

Inter-modal set-up:

These twin cities should have a multi-modal and inter-modal set-up at both ends. With this, Bhopal should be able to provide better rail connectivity for goods from Indore (& malwa region), whereas, Indore should assist in air consignment linkage with rest of the country. This connectivity would usher a strong logistics business from the twin capital region for the entire central India.

Industrial Township:

The distance between the two cities would be further shortened by densifying the industries between these cities. There would be concentrated efforts made to attract establishment of suitable PSU investments, which can spur ancillary units, along with special promotion package for entities interested in establishing residential compound adjoining to this belt.

b. **Sustainable transportation**

c. **5. <u>Sunshine State:</u>**

Like most of the central India, MP is endowed with h sunshine (5.5kwh/day) for roughly 300 days in the y

bounty is evenly spread across the state and becomes more valuable with quite evenly spread low population density. The availability of tracks of open lands can significantly help the deployment of solar generation capacities. Similarly, a relatively low population density could translate in lower requirement of energy storage capacities, which currently is the biggest cost component for renewal energy establishment.

A large portion of the travel requirement is homogenous (travel to common nearby locations), in the rural area. This feature assists the shared transportation model currently in most rural places. These scenarios are ideal for making a shift to electric vehicle based mobility as the marginal operations cost can be brought down significantly which can assist the transport options and travel density in these areas, provided the availability of efficient charging infrastructure.

State plans to device two pronged support strategy to promote zero emission electric mobility.

Incentivizing EV Adoption:

In addition to subsidized EV purchase price, the state plans to introduce an incentive model for discarding, old/polluting vehicles and link this incentive to purchase of Electric vehicle; this shall be a capped financial incentive model clubbed with regulatory exemptions of registration fee and road tax. It is also planned to incentivize retro-fitment kit for hybrid or fully electric conversion of conventional fuel based vehicles.

To lead the transition, state is pioneering adoption of EV in public transport and government use. This shall be further backed with phase wise targeted migration of urban public mass transport systems to EV and new permits shall be preferred to those applying to ply EVs for public transport. Besides, state shall turn pilot into implementation by adding more EVs in the fleet of vehicles used by government officials & offices.

The state is in process of finalizing its EV policy with a focus on promoting EV mobility and turn into favored destination for manufacturing of EVs and related equipment/components.

Setting-up enabling Infrastructure:

Madhya Pradesh is blessed with abundant sunshine with high solar irradiance almost throughout the year. The state also leads in solar power production with one of biggest solar plant in Asia coming up. State envisions capitalizing on this strength for its EV infrastructure thereby making it truly green mobility. Initiatives planned in this direction include setting-up of EV charging infrastructure at Railway Stations, Bus stations, government offices etc. Provision of reserved slots and charging infrastructure for EV at public parking shall be made available. Government shall incentivize solar based charging infrastructure by private players and mandating provisions for EV charging infrastructure at new residential and commercial complexes. Going forward, installation of smart grid network for charging infrastructure and fast charge infrastructure on commercials routes such as Bhopal-Indore will be part of the work plan for the state.

Reference Responsibility Matrix

		Strategic	Transport - Current	Addition to	UAD - Current	Addition to
Market led urban	S1	*STDA*			*TOD incorporation*	
	S1				*Green policy*	
	S2			*ITS platform*	*ITS platform*	
	S2				*Unified ticketing-*	
	S2				*Open data*	
	S3			*ICCC*	*ICCC*	
	S3		*Education*	*Safety*	*Safety mechanism*	
Rural connectivity	S1	EV led				
	S1			*Community*		
	S2			*Route Planning*		
	S2		*DTA*	*Infrastructure*		
	S3			*financing*		
	S4		*Education*	*Governance*		
Transitioning the	S1	Routes expansi				
	S1	SPV				
	S2	ITS info		Transport logistics		
	S3			Cargo capacity		
	S4					Last mile
Growth corridor between	S1	High speed				
	S2	Rail upto industrial		Inter-modal		
	S3					Industrial
Sunshine	S1	*Regulation*			*Regulation*	
	S1	*Generation*				
	S2	Gov. use			Adoption incentive	
	S2	EV policy	Retro fitting			

Maharashtra

Introduction

Transportation is the mainstay of economic development of any region. Better transportation helps people reach jobs and other places of interest. It also enables goods reach the consumers.

Traditionally, improvements in this sector have focused on enabling people reach their destinations *faster*, generally implying using personal motor vehicles. This approach has helped only those who have the means of owning and using such vehicles, yet has left our roads congested and air polluted. Focus on speed, coupled with easier availability of more powerful and faster vehicles has also had an adverse impact on road safety.

This paper, therefore, focuses on “mobility” than “transportation”. The focus is on questions like how can the poorer sections also have access to more jobs, how can the young and elderly commute independently and how can people reach home safely. And of course, on how to do this “sustainably”, by consuming as few resources as possible.

We present Maharashtra’s strategy for providing sustainable and safe mobility for all people.

Abbreviations

GHG: Green-House Gases

GoM: Government of Maharashtra

MRT: Mass Rapid Transit

MSRTC: Maharashtra State Road Transport Corporation

MUMP: Maharashtra Urban Mobility Policy

NMT: Non-Motorized Transportation

PMV: Personal Motorized Vehicles

Existing mobility scenario in Maharashtra

Maharashtra is one of the most urbanized states of India. As much as 50% of its population is urban. A lot of regional mobility and freight movement is also attributed to cities, thus has urban connotations.

Increasing use of Personalized Motor Vehicles (PMVs) has congested our cities. And the situation is not much different with highways too: Maharashtra has widened many highways to accommodate traffic, but vehicular growth has always outpaced building additional lanes.

SWOT analysis of Maharashtra's mobility scenario

Strengths

Maharashtra is a financially strong state. It has always embraced new ideas in all fields.

Weaknesses

People's desire to own and use personal motor vehicles, made possible by increasing income levels, could turn out to be a hindrance in reducing congestion levels as well as carbon footprint.

Fundamentals of sustainable transportation are not yet ingrained in society as well as political and administrative strata.

Opportunities

Maharashtra has drafted a very progressive Maharashtra Urban Mobility Policy (MUMP). A few cities in Maharashtra are a step ahead and have already started reforming their transportation system.

Threats

While the advantages of electrification are acknowledged, it might unleash a monster of disposal of dead batteries.

Today's technology driven mobility solutions are possibly inducing people to make more trips using vehicles with a higher carbon footprint, instead of shifting them to public transportation and NMT.

Maharashtra s mobility vision and goals

Vision and goals

Maharashtra's vision is to provide sustainable and safe mobility for all people by eliminating dependency on PMVs, by providing 65,000 high quality buses (at least 75% electric) and 10,000 km safe Non-Motorized Transport (NMT) network.

Maharashtra intends to achieve the following mobility goals by 2030:

- Sustainable mobility: Reduce per capita transportation emissions by 33%
- Safe mobility: Reduce road crash fatalities by 75%
- Mobility for all: Achieve 80% modal share by sustainable modes by focusing on public transportation and NMT
- Mobility for all: Make all transportation infrastructure universally accessible

Projects to fulfil the vision

Public transport: Deploy large fleet of high quality buses

- Urban sector: A fleet of 40,000 buses (all electric buses by 2030)
- Mass Rapid Transport (MRT): A total network of 900 km, covering all cities with a population of 10 lakhs or more.
- Regional: A fleet of 25,000 buses (at least 33% electric buses by 2030)

Non-motorized transport: Provide safe, well designed NMT infrastructure

- Urban: All 12m+ urban roads to have footpaths (~6000 km), and cycle track network of 4 km/ lakh urban population (~3000 km)
- Regional: NMT-safe roads (~1000 km)

Universal Accessibility: Design inclusive infrastructure for people with different abilities

- For all new transportation infrastructure: Standardize on universally accessible models and designs
- For all existing transportation infrastructure: Retrofit to be universally accessible

Road safety: Develop a data driven and responsive system

- Systematic collection and analysis of data on road traffic crashes, followed by implementation of suggested safety measures
- Improved and responsive trauma care

Development of Sustainable Mobility solutions

The themes

Solutions to put Maharashtra on a firm path towards sustainable mobility will follow the six excellent themes of transformative mobility.

Maximize Asset Utilization and Services

We tend to consider financial and material resources as the principal resources. Theoretically it is possible to create more of these resources. However, space and clean air are resources that are in limited supply by definition, and thus are among the most precious. Maharashtra will focus on improving mobility by promoting public transportation and NMT, the modes that inherently conserve these resources. For example, one lane of Bus Rapid Transport (BRT) can easily carry the same number of people carried by 2 or more mixed traffic lanes, hence our cities will benefit from about 800 km BRT systems. Using technology, Maharashtra will also focus on making public transportation more efficient.

Comprehensive Electrification

Substituting fossil fuels by electricity is a promising proposition. Yet, in order to not load the electricity grid as much as possible, Maharashtra will focus on generating the electricity locally by harvesting wind and solar energy.

Electrification of Maharashtra’s public transport undertakings’ bus fleet will be comprehensive, with 100% urban buses and at least 33% regional buses running on electricity.

Electrification of personal motor vehicles can also lead to reduced urban pollution. However, considering that most of the congestion is attributed to these vehicles, the state will make sure that their electrification does not encourage putting more personal vehicles on the roads. Further, the state will also ensure that their electrification process is not cross-subsidized by people who use modes that cause the least congestion and have a lower carbon footprint, viz. public transportation and NMT.

Alternative Energy

Maharashtra will intensify its efforts of harvesting alternative sources of energy like wind, solar, ethanol and hydrogen cells. While acknowledging that CNG is also a non-renewable fossil fuel, the state will promote it over diesel, considering health hazards caused by diesel emissions.

In addition, as far as urban transportation is concerned, Maharashtra also intends to harvest a form of energy that is generally ignored - human energy. Even today, about 40% intra-city / intra-town trips are done on foot or with bicycles. Maharashtra will build 10,000 km of safe, high quality and attractive NMT infrastructure: 6000 km footpaths and 3000 km cycle tracks in cities, as well as 1000 cycle-safe regional roads. The state will also simultaneously discourage use of motorized personal vehicles. This will convert as many short and medium length motorized transport trips as possible to NMT modes.

Apart from reducing the strain on energy creation and distribution, focus on NMT will also contribute to a healthier Maharashtra.

Reinventing Public Transport

Hitherto, most Indian cities have generally looked at public transport as a loss-making proposition, even while agreeing that it needs to be strengthened. Treating mobility as a vital service, Maharashtra will henceforth consider public transportation as an investment than a liability. This includes formal as well as informal public transportation.

Maharashtra has a vision of establishing a formal public transportation operation in every Municipal Corporation. These services could be provided either at city level or by a dedicated state level urban transport undertaking. They will be well integrated with informal public transportation to provide nearly doorstep public transportation solutions. Both formal and informal public transportation operations will be supported by well-developed terminals and multimodal interchange facilities at all regional and major intra-city terminals. The urban public transportation operations will be supported by a fleet of 40,000 buses. Development plans of cities will allocate 100 sq. m space per bus for depot facilities. Regional connectivity will be supported by 25,000 buses in MSRTC’s fleet.

Following the theme of eliminating dependency on personal motor vehicles, Maharashtra looks at all shared vehicles as public transport. Apart from formal public transportation, this includes shared bicycles, shared autos, taxis and rickshaws, app-based shared mobility solutions etc. Maharashtra will also work on using technology to provide seamless mobility solutions, where an app can help a commuter reach his destination primarily using public transportation modes.

Logistics and Goods Transport

A successful mobility strategy concerns passenger mobility as well as goods mobility. In fact, supply chain networks are the thread linking different parts of the globe for mutual and inter-dependent commercial interests.

The Government of Maharashtra (GoM) has recognised that an effective logistics mobility system requires a strategic approach for transporting goods and freight between suppliers, manufacturers and distributers, warehousing facilities and clients, and all other points in between. This also implies effective cost management, to add to the sustainability of this system. In order to do so, GoM will

formulate and implement a mobility system that utilizes the complete range of transportation options available.

Data Analytics and Mobility

Adequately anonymized mobility data generated by mobile devices, smart fare collection cards etc will be used to identify public transportation and NMT deserts. Targeted steps will be taken for providing attractive sustainable transport alternatives to people who are using high carbon footprint modes of mobility.

Development of mobility sub-plans

GoM has already published a progressive draft of Maharashtra Urban Mobility Policy (MUMP) to promote sustainable transportation. The essence of the urban plan described below is to implement MUMP. Though the MUMP is for urban regions, the essence of MUMP applies to rural and regional regions as well.

Urban plan

Steps to be taken by Cities

Traditionally, cities have allocated only about 10-20% of their transportation rupee for improvements in public transportation and NMT. A large portion of municipal budgets, and also many large projects in cities funded by the State have been aimed at making use of PMVs easier. The result of this traditional thinking is there for all to see.

MUMP urges cities to prioritize public transportation- and NMT-centric projects over PMV-centric projects. Maharashtra envisages that cities would allocate 60% or more of their transportation budget for sustainable modes.

The primary goal MUMP has set for the cities is to achieve 80% modal share by public transportation + NMT. While this may seem to be a tall order, it should be noted that even today this share is about 60%. However, this share is rapidly declining since facilities for public transportation and NMT are insufficient, of poor initial quality, and their maintenance is neglected.

To help cities prepare plans for achieving this goal, MUMP suggests some metrics for cities. Accordingly, the cities of Maharashtra will:

- Provide 50 or more standard buses (or equivalent) per lakh population served. Statewide, we envisage a standing fleet of 40,000 buses by 2030.
- Develop walkable footpaths along all roads that are 12 m or wider - which would be of the order of 8 km footpaths per lakh population. In accordance with the Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act (2014), the footpaths will provide planned and designed spaces for vendors to fulfil people’s local needs by avoiding motorized trips. Thus, the state will develop about 6,000 km of walkable footpaths to support the most sustainable form of mobility- walking. And
- Develop a network of cycle tracks - of the order of 4 km cycle tracks per lakh population. This will lead to about 3,000 km cycle tracks in the state, providing a safer and healthier mobility alternative to the young and old and the rich and the poor.
- To ensure usability of especially the NMT infrastructure, cities will establish urban design departments. All roads will be designed by urban designers.

In addition, cities larger than 10 lakhs will also develop bus-based MRT systems to ensure that people using public transportation do not get stuck in traffic. Statewide, this will add up to about 800

km BRT systems. Mumbai, Pune and Nagpur may need high capacity Metro systems, making a total of about 900 km MRT in Maharashtra.

The draft policy urges cities to reduce or stop spending on projects that benefit PMVs. Examples of such projects are: flyovers and grade separators designed for better movement for personal motor vehicles, road widening, parking lots, and mechanized parking.

Cities in Maharashtra will also not spend money on projects that ostensibly help pedestrians, but in reality, help smoother and faster movement of PMV, thereby encouraging their use. Examples of such projects are: foot over-bridges and skywalks.

An innovative clause in MUMP wants cities to spend about 1% of their transportation budget for propagating sustainable transportation fundamentals among people.

Steps to be taken by GoM

The GoM is focused on taking the draft MUMP to completion and also on its speedy implementation. It will take the following steps for this purpose:

- Conduct capacity building workshops for cities
- Develop and provide templates, standards and guidelines for projects that promote public transportation and NMT
- Set up a data center for systematic collection and analysis of mobility parameters in cities
- Monitor and evaluate mobility parameters, and recommend data driven remedies to help cities remain on track of achieving the mobility targets
- While promoting public transportation and NMT, in parallel, also take steps to dis-incentivize the use and ownership of PMVs
- Provide funds for innovative pilot projects that promote public transportation and NMT
- Adopt land use regulations that incentivize higher density commercial and residential development within walking distance of major public transport corridors.

Taxation reforms

The subconscious taxation philosophy has been to tax entities based on what they earn. This philosophy leads to taxing buses who consume fewer resources per person-km, but not to personal cars who consume more.

Maharashtra will recalibrate the taxation system so that it encourages modes that contribute to Maharashtra's mobility goals.

Shared mobility

Maharashtra will promote shared mobility of various types, while ensuring that-

- Shared mobility trips do not increase at the cost of modes that have an even lower carbon footprint,
- Easy availability of new modes does not trigger unduly large latent transportation demand, thus leading to higher congestion levels.

Maharashtra intends to develop a policy framework for shared mobility such that it contributes to the overall goals put forth by MUMP.

Rural plan

In order to formulate a comprehensive rural mobility plan, the following subjects have been scrutinized towards establishing an effective rural plan and its implementation:

1. **Integration of informal public transport in rural areas:**

This will allow fixing of routes and rates and subsidization of costs. Informal public transport will cater to central work areas/markets, schools and colleges, and also goods movement.

2. **Promotion of water transport:**

In Maharashtra, a number of villages and towns are nestled by the riverside, in addition to sharing the coastline of the Arabian Sea. GoM has envisaged that promoting the use of boats as a regular and mainstream means of transport will ensure utilization of the state's waterways and help to subsidize the cost of boats itself. This specific mode of transport will be deployed and encouraged only after due training is given to villagers, viz. usage and working of the boats, and safety/precautionary measures to be exercised. This measure will be strengthened by building jetties at river banks and fixing routes and rates to ensure efficiency and transparency.

3. **Promotion of non-motorised transport options:**

GoM has recognized the practicality of non-motorised vehicles such as cycle rickshaws and animal carts in rural areas, especially for short distances. GoM will promote use of bicycles for last mile connectivity by implementing measures like providing safe bicycle parking at MSRTC stands. There are ongoing discussions regarding new legislations at the state level, exclusively pertaining to non-motorised transport.

4. **Route rationalization for state transport buses:**

As of 2018, MSRTC serves 96% of rural areas having good roads in Maharashtra. However, GoM has identified the need for rationalizing bus routes to improve their frequency and load factor. This will improve utilization of the fleet.

5. **Development of bus infrastructure viz. depots and terminals:**

GoM has envisioned a number of bus depots and multi-modal transit terminals in order to develop a highly inclusive mobility plan. The government plans to make buses compliant to urban bus specifications, while deploying sophisticated technology such as Automatic Vehicle Location System (AVLS), Automatic Fare Collection System (AFCS), e-Ticketing, collision avoidance, emergency notification and other intelligent transport management systems. GoM intends to develop smart bus depots, state-of-the-art multi-modal transit terminals and maintenance facilities for passengers, operators and visitors. Multi-modal transit centres are at the core of this fortification effort, in order to minimize transit time and develop high quality public transport.

Regional plan

With more and more people being able to afford personal vehicles, regional roads and highways are also seeing unprecedented levels of traffic and congestion. Just like cities, at regional level too, the state has been trying to combat congestion by adding more and more lanes to roads. Immediate improvements in connectivity have improved economic activity around such roads, but it has also led to unleashing transport demand. While increased transport demand is not a bad indicator by itself, it is being met largely with PMVs, putting stress on the Government machinery to build more and more roads. This is also increasing demand for fossil fuels, thus stressing India's foreign exchange reserves.

Though electrification is being promoted across India, it might take a generation before the absolute number of Vehicle Kilometers Travelled (VKT) by vehicles (especially PMVs) using fossil fuels, starts declining.

In order to combat these disadvantages, Maharashtra proposes to strengthen its regional public transportation services also. Maharashtra's population may increase only by about 10% from 2018 to 2030. However, considering increase in the trip rate as well as the need to improve even the regional public transportation share, Maharashtra intends to increase its regional bus fleet by at least 30 to 40%, also encouraging a similar capacity improvement in private operators.

This will be achieved by a mix of the following measures-

- Increasing and improving MSRTC fleet from 18,500 today to 25,000
- Building and modernizing MSRTC stands, terminals and depots
- Providing facilities like terminals for private operators, though they may come at a fee
- Employing Traffic Demand Management (TDM) measures like tolls and road tax
- Any other appropriate measures

The PWD of Maharashtra is already working on developing 1000 km cycle-safe roads to promote non-motorized regional commute.

Compared to many states, Maharashtra's regional railway network is sparse and the frequency of trains is also low. Maharashtra will work with the Center to strengthen its rail connectivity to improve the regional modal share of rail compared to road travel, for commuters as well as freight.

Maharashtra is exploring the possibility of implementing modern systems such as hyperloop, which could be a cost-effective alternative to air transport. While investing in such systems, we will ensure that modes that serve the masses are not starved of funds.

Across the state

Awareness about sustainable transportation

Democracy is not an aggregation of uninformed views. To ensure that sustainable transportation initiatives are not impeded by beliefs in failed traditional practices, Maharashtra will conduct campaigns to create awareness about sustainable transportation planning.

Protecting the environment

Disregard to the ecosystem, in rural as well as urban areas, has been leading to its destruction because of infrastructure development. Maharashtra will avoid roads construction in fragile ecosystems and restrict it to only NMT infrastructure in eco-sensitive areas.

Road safety

With about 13,000 road crash fatalities every year, Maharashtra has a dubious distinction of having some of the most unsafe roads in the country. Going beyond WHO's Brasilia Declaration on Road Safety, Maharashtra will plan to reduce the number of fatalities by 75% or more by 2030.

Maharashtra will establish a data driven system for collection and analysis of road traffic crashes. The system will also include enforcement components like e-challans and a penalty points system tied with insurance and validity of driving license. Recommendations from the analysis will be speedily acted upon.

Maharashtra will also improve the post-crash trauma care by ensuring a faster response time and availability of trained paramedics along the entire National and State highway network.

Universal Accessibility

Maharashtra will adhere to the Rights of Persons with Disabilities Act (2016) and ensure that all new transportation infrastructure is designed to be universally accessible. It will also take steps to retrofit existing transportation infrastructure to make it universally accessible.

Women's safety

Maharashtra will take special efforts to ensure that our transportation, especially the streets and public transportation, are safe and convenient for women.

Freight and logistics

GoM is examining the following measures that may be taken as steps towards smoother freight and logistics in the state:

1. Building of railway lines till the industrial development corporations (MIDC) / Special Economic Zones (SEZ), ports and airports for avoiding road freight movement
2. Building of road networks that bypass the city
3. Exploring phase out of diesel goods vehicles and replacing them with greener alternatives such as CNG and electricity
4. Development of centralized warehouse/distribution centers to better distribute goods on the basis of delivery location/pin code and trucking schedules
5. Development of truck terminuses at periphery of the city to provide parking, re-fueling, boarding and lodging facilities
6. Earmarking of stringent timings of road usage for goods movement in cities
7. Strengthening of road and rail connectivity with ports across the state
8. Deployment of sophisticated technology for inventory management, vehicle tracking, book-keeping and automation of warehouse terminals
9. Stringent inspection of goods and warehouses on regular basis
10. Collation of feedback from end consumers to further upgrade quality of logistics
11. GoM has identified the sea ports to be developed for freight movement

The following subjects need to be addressed immediately in order to build and maintain smooth-flowing connectivity to ports:

1. Issues in connectivity from ports to state/national highways
2. Fillip needed to boost hinterland connectivity from the ports

High cost of development of connectivity due to terrain of Western Ghats.

Key strategic levers for addressing mobility

Mobility for All

Maharashtra dreams of treating mobility in the same league as “roti, kapda aur makaan”. People centric and sustainable mobility solutions are key to Maharashtra’s mobility strategy. The concept of “Mobility as a Service” frequently focuses on technology alone. While that is good, our idea of mobility as an essential service implies that the State should not think about profits and losses while investing in sustainable transport solutions, just like we don’t pay heed to profit and loss of a water supply project. Maharashtra realizes that investing a rupee in public transport boosts the economy by four rupees.

Reduction in GHG

India ratified the Paris Agreement within the United Nations Framework Convention on Climate Change (UNFCCC) in 2016 and pledged to cut down on its emissions by submitting its Nationally Determined Contributions (NDCs).

According to this commitment, India shall cut the emission intensity of its GDP by 33 to 35 percent by 2030 from 2005 levels.

Government of Maharashtra fully backs India’s efforts and aims to fast-track a sustainable multi-modal mobility plan to make a meaningful contribution to these efforts.

Maharashtra’s vision of providing sustainable mobility to all people focuses on public transportation and NMT, which will substantially reduce Maharashtra’s transportation carbon footprint. Augmented with electrification of public as well as private vehicles, Maharashtra will lead the way towards reducing India’s GHG emissions as far as transportation is concerned.

Current and proposed reforms

MUMP will induce a paradigm shift in the way urban transportation is planned. It includes the following key reforms:

1. Budgetary reforms: MUMP encourages cities to allocate a large part of their transportation budget towards public transportation and NMT projects.
2. UMTA and UTF: Maharashtra will help cities set up Unified Metropolitan Transport Authorities (UMTA) to ensure that all agencies related to transportation act in unison. We will also set up Urban Transport Funds (UTF) to pool all financial sources of the cities like farebox revenues, parking fees, municipal taxes etc, from which sustainable transport projects can be funded.
3. Maharashtra is also contemplating an RTF (Regional Transport Fund), to fund sustainable transport projects in regional and rural settings.

Appendix

Publication of MUMP, earlier known as Maharashtra Urban Transport Policy

Publication of Maharashtra Urban Transport Policy.

Government of Maharashtra,
Urban Development Department,
Mantralaya, Mumbai-400 032.
Dated: 01/06/2017

NOTICE

TPS 1816/921/CR 491/16/UD13 - Whereas at present, growing use of personal motor vehicles in Maharashtra is contributing to traffic congestion, poor air quality, declining public health, increasing number of road fatalities, and social segregation. Responsibilities in decision making and financing of urban transport projects are fragmented, involving multiple agencies at the central, state, and local levels;

And whereas ,personal motor vehicle-oriented infrastructure, such as road widening, elevated roads, flyovers, and multi-storey parking, offer at best short-lived improvement in traffic conditions but are insufficient to meet the growing mobility needs of cities in the State. This infrastructure is not inclusive of all users of the transport system. Excessive reliance on personal motor vehicles leads to inefficiencies and financial non viability;

And whereas GOM seeks to reverse these trends through the **Maharashtra State Urban Transport Policy (hereinafter said draft "SUTP").** Successful urban development is achieved through transport planning that focuses on movement of people rather than vehicles, a goal clearly expressed in the **National Urban Transport Policy (NUTP)** by the Ministry of Urban Development, Government of India. Thus, the SUTP prioritises sustainable modes of transport like walking, cycling and public transport and dissuades the use of personal motor vehicles. GOM seeks to invest in transport projects that are sustainable and represent the best value for all citizens for the money expended, and is therefore issuing this SUTP that is user friendly;

And whereas, the Government of Maharashtra (GOM) aims to develop efficient, attractive, equitable, inclusive, safe, and environmentally sound urban transport systems within the framework of a competitive market economy. Efficient, sustainable, and equitable transport systems are key to the economic and social development of Maharashtra's growing cities;

Now therefore, the Govt. of Maharashtra hereby, publishes the said draft **Maharashtra State Urban Transport Policy which is annexed** herewith for inviting suggestions/objections from any person with respect to the said MUTP policy within a period of one month from the date of publication of this notice in the newspaper.

Any objections and suggestions to the said MUTP policy be forwarded to the Deputy Director of Town Planning, Urban Research Cell, Central Building, Pune before the expiry of one month from the date of publication of this notice in newspaper. The objections or suggestions, which may be received by the concerned Officer appointed, within stipulated period shall be considered by the government while finalising the said policy.

URBAN DEVELOPMENT DEPTT. MANTRALAYA, MUMBAI-32

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This Notice shall be kept open for inspection to the general public in the following offices for the above period on all working days.

(i) Office of the Director of Town Planning, Central Building, Pune;
(ii) Office of the Joint Director of Town Planning, Pune, Nashik, Nagpur, Konkan Aurangabad, Amravati Division;

(iii) Officer of the Deputy Director of Town Planning, Urban Research Cell, Central Building Pune.

This notice shall also be published on the Government website www.maharashtra.gov.in (कायदे / नियम).

(R. M. Pawar)
Under Secretary to Government

Manipur

Initiatives/steps taken:

(i). **State Level Task Force** : It has been constituted under the Chairmanship of Chief Secretary, Govt. of Manipur with other 11 senior officers drawn from various line Departments vide Govt. Order No. 12/3/2018-T(MV) dated 26th June' 2018.

(ii) **National Orientation Workshop on Transformative Mobility** held on 28-06-2018 at NITI Aayong Bhawan, New Delhi : Shri M. Lakshmikumar Singh, IAS, Commissioner (Tpt) cum Administrative Secretary (Tpt) and Shri Ph. B.K. Sharma, OSD/Transport cum Joint Director of Transport attended the workshop representing the State of Manipur. During the workshop the following major issues were highlighted:-

Multi-modal transit corridor proposed to integrate Rural and urban transport
Absence of public transport system
Wheelers serve as intermediate public transport
Need improvement in helicopter service.

(iii) **Regional Workshop on Transforming Mobility in India** organised by Transport Department, Govt. of Assam in association with TERI Assam Administrative Staff College, Guwahati held on 3rd August' 2018: Shri Ph. B.K. Sharma, OSD/Transport cum Joint Director of Transport and Mrs. Sarma Khoisnam, SP/Traffic Control Wing, Manipur, Imphal attended the workshop representing the State of Manipur and Shri B.K. Sharma presented a PPT on the major issues/challenges of the State which will be fairly a platform in formulating State strategies on Transformative Mobility. Shri B.K. Sharma also participated the brain storming session and highlighted the concept/protocol of BRTS which would be a best and most suitable model for introduction in the North East Region where the project of MRTS/LRTS (Metro System) is not illegible as per the yardstick of NITI Aayog (not lesser than 75,000 PHPDT) accepting Guwahati and other issues of encouragement of NMMT.

Basic Elements for formulating the State Strategy in Transformative Mobility:

(i) To understand & identify the core areas in each and every mode of transport with their grey areas where the attention of the State Administration and other stake holders are highly warranted with an objective of holistic approach with the vision of how to redress such challenges and create an spectrum with the concept of proper integration of all modes of transport which need a very critical and academic analysis of the basic features/parameters indicating the gap between the demand & supply status of the public transport system.

(ii) Ideally, it is not a very easy task to formulate/draft state strategies within the scope of Transformative Mobility as envisaged by the NITI Aayog with a broad vision of multi-modal integration with the application of data based advanced information system such as Intelligent Transport System (ITS), Transport Demand Management (TDM), GPS/GIS, smart parking, park & ride System, road pricing, land use planning, environmental impact analysis, cost benefit ratio, conduct of n number of critical surveys/studies such as advanced O-D survey, traffic volume count survey, good/freight movement count survey, peak hour peak direction trip (PHPDT)/per capita travel demand/split mode studies besides headway calculations etc.

(iii) The above analysis/studies are very important tools/aspects required to be established before making /formulating any master plan pertaining to Urban Transport Planning of a particular city based on the geographical location, its population, car ownership, availability of urban transport infrastructure/status of other modes of transport such as Air, Rail& IWT and other features determining the optimal approach based on demand orientation.

(iv) The intrinsic and qualitative analysis of the above features /surveys will led to assessment/determination of Passenger Car Unit (PCU) of a particular/important corridor/arterial road/junction and ultimately ascertained the volume capacity ratio which indicates the gravity of congestion along a particular stretch.

(v) The basic principle of TDM is not to be built up/create any other urban transport infrastructure of a city but to check and contain the ever increasing congestion with the application of administrative measures such as introduction of Public Transport Priority System (PTPS) integrated with BRTS with the creation/development of dedicated lane, park & ride system, levy of gasoline tax, hiking of parking fees/motor vehicle taxes, introduction of "No Your Car Day" with complementary offers in the case of organised tours on week-end holidays, car sharing, staggering of timings of govt. establishments/offices/ schools/markets , proper zoning of activities/facility centres such as commercial, industrial, residential, parks & resorts, common utility centres etc. with the concept of proper land use pattern besides encouragement of last mile connectivity/feeder service and NMMT.

In short and considering the immediate importance of formulating the State Strategy Plan as well as a Regional Strategy Plan of the NE Region which will be a frame work paper for the scheduled Global Mobility Summit to be held on 7th – 8th Sept' 2018 in New Delhi to be inaugurated by the Hon'ble Prime Minister, the following concepts/strategies may please be incorporated while finalizing the Regional Strategy of the NE Region:-

(i) **Introduction:** Manipur is one of the small but fast growing state of NE region having total area of 22,327 km^2 with a rough population 28,55,794 (2011 census) with a density of 130/km^2 . It is surrounded by Nagaland on the north, Mizoram on the south, Assam on the West and then by Myanmar on the east extended about 390 km of international boundary. Imphal is the capital city of Manipur and it has 16 districts out of which only 4 districts namely Imphal West, Imphal East, Bishnupur & Thoubal are valley districts and remaining 12 districts are hilly regions making difficulties in providing public transport system considering the hostile terrains compounded with unworthy road conditions resulting to poor connectivity.

(ii) **Basic mode of transport available: (a) Road transport, (b) Air transport, (c) Inland water transport**

(a) **Road transport:** The effective vehicle population as on March' 2018 was 3,74,968 (with PC rise of 10.2% from the last immediate year) out of which no. of 2 wheelers & cars (personalised 4 wheelers) were 2,53,855 & 64,906 respectively, Total: 3,18,761 taking 85% of the total population and whereas no. of buses is less than 1600 and no. of IPT mode passenger vehicles is about 20,000 including school vans. The above statistics shows that the public transport system is totally collapsed and substantially performed by a good no. of diesel autos and maxi cabs such as tata magics/wingers under the IPT mode.

(a.1) **Strategy to develop public transport system**: The Manipur State Road Transport Corporation (MSRTC) was liquidated in the year 2003 by a cabinet decision with prior approval of the Ministry. The Manipur State Transport (MST) has been re-established w.e.f. 25th June' 2017 with launching of inter-district as well as city bus service with a mixed fleet of 10 nos of SLF buses (JnNURM) and 6 nos of brand new Marcopolo buses (Total= 16 buses). However, in the later stage city bus service was withdrawn due to lack of requisite fleet size/frequencies. 21 more brand new buses shall be procured/introduced in the left out inter-district routes where there is poor connectivity shortly. At the same time, the department is also actively examining to formulate a sustainable modal to bring private participation under PPP mode to operate private buses under the banner of MST due to the fact that the department desires to keep the financial liability of the MST at the minimum possible extent but to sustain the establishment/ management liabilities of the MST.

(a.2) **3 wheelers serve as Intermediate Public Transport:** In the absence of affordable, reliable, sustainable public transport system in the State, a large fleet of diesel autos numbering 7655 are operating in 118 different routes of IW & IE under the management of 77 private Transport Societies/Assn. transporting passengers connecting Imphal City. At the same time about 2500 Tata-Magics/wingers are also converging at Imphal City Centre originating from

various parts of the State. The main objective for constitution of the committee on multi-modal transit corridor is to look/examine these issues and to formulate a sustainable modal for introduction of battery operated/other well designed city buses in Imphal City with transfer of passengers carried by these IPT mode vehicles at proper/convenient junctions located at the outskirt of the Imphal City.

(a.3) **Introduction of e-rickshaws as para transit mode as well as last mile connectivity/feeder services:** 7 e-rickshaws dealers are authorised for sale and servicing in the state and another 5 dealers are in the pipe line for licensing.

(a.4) **International Bus Service:** Present Status of Imphal- Mandalay Bus Service under IMT:

A comprehensive proposal for introduction of Imphal – Mandalay Bus service was submitted to the Ministries of DONER & MORTH in June '2009 after a public demand was passed by the Manipur Legislative Assembly on 1st August ' 2003.

Agreed minutes of India-Myanmar Inter-Ministerial Technical Level Talks on the Imphal Mandalay Bus Service was signed on 13th June' 2015 at Nay Pyi Taw between the Govt. of India & Govt. of the Republic of the Union of Myanmar.

Joint Technical Survey of Imphal- Mandalay Bus Route was conducted in between 12th – 15th Jan' 2015.

The trial run of Imphal-Mandalay Bus Service was flag off on 9/12/2015 from Imphal. The Indian team proceeded up to Nay Pyi Taw by road and attended the meeting on Indo-Myanmar-Thailand (IMT) Motor Vehicle Traffic Protocol on 11/12/20115 and back to Imphal in the evening of 14/12/2015 along with 27 Myanmarese delegates.

Indo-Myanmar-Thailand Friendship Motor Car Rally (13TH Nov – 3rd Dec) : The IMT Friendship Motor Car Rally which was piloted by the Ministry of Road Transport & Highways, Govt. of India and flagged off from New Delhi on 13th Nov, 2016 and concluded at Bangkok, Thailand on 3rd Dec, 2016.

As desired by the MoRTH, GoI, and as was done by the Myanmar side, a private travel agency namely Seven Sisters Holidays, Imphal has been appointed by the state govt. as travel agency for the Imphal- Mandalay bus service.

A report has been submitted by the state govt. to MoRTH, GoI in this regard. The Ministry is in touch with the Govt. of Myanmar through MEA. The regular bus service is expecting sooner or later once the motor vehicle traffic protocol on Indo-Myanmar-Thailand (IMT) is finalised.

(b) **Air Transport:** Imphal is well connected by air however there is gaps in regional connectivity which is being taken care by the Ministry of Civil Aviation, Govt. of India under the UDAN schemes.

(b.1) **Status of Imphal International Airport:** The Imphal Airport has been declared as an International Airport in November 2013. However, no regular international Flight service is yet introduced even though Golden Myanmar Airlines maiden chartered flights landed at Imphal International Airport during Manipur Sangai Festivals, 2013, 2014 and 2015. It would be a great endeavour for the people of Manipur as well as the Manipuri-Myanmarese inhabited at Mandalay (about 20,000) if regular International flight between Imphal –Mandalay-Bankok-Rangoon is introduced at least once in a week.

(b.2) **Helicopter Service:** # Presently, the transport department is handling 2 separate schemes of helicopter service namely MHA Subsidy Scheme (75% subsidy) & another is under UDAN-2, RCS of MoCA (90% subsidy) for which the OLS is actively conducting covering Thanlon, Parbung, Tamenglong, Jiribam & Moreh.

Present status of the Schemes: MHA, GoI recently approved the proposal for introduction of chopper service for connecting Imphal with Moreh, Tml & Jbm with Pawan Hans Ltd. as operator on nomination basis for a period of 6 months or till the finalization of bidding process whichever is earlier. All the requisite ground works and other logistics are more or less completed excepting some issues with Assam Rifles Authority (for utilization of helipads located at 11th AR, Moreh & 23rd AR, TML) and early conduct of trial landings is in the pipe line

 # Air Ambulance: The above two helicopter services is further followed by another 3rd scheme namely Air Ambulance which is also actively pursuing.

(c) **Inland Water Transport (IWT): Background:** The Inland Waterways Authority of India (IWAI), Ministry of Shipping. Govt. of India had conducted a preliminary survey for identification of potential waterways in the North East India through RITES and accordingly the IWAI published their report in 2011 and wherein Loktak Lake & Barak River were identified for development of Inland Waterways The Transport Department has taken up Loktak Inland Water Transport Project on priority and the Project- I has already been completed Loktak Inland Water Transport Project-I

(c.1) **Project Implementation**: Construction of jetties and terminal buildings for providing IWT in three designated routes connecting with economically backward villages/islands compounded with lack of public transport

(c.2) **Status of Project-I:** Completed with construction of 3 terminal buildings & 4 jetties besides land development & construction of approach roads.

(c.3) **Objective of Loktak Inland Water Transport Project- II (ongoing):** To cover left out villages of Loktak Lake.

(c.4) Barak Extension (60 km):

- A project profile namely Barak Inland Water Transport Project for development of Barak Extension (60 km) has been submitted to the Ministry of Shipping, GoI/Inland Waterway Authority of India (IWAI) for consideration and approval.
- The up-stream of Barak river upto Nungba is navigable round the year with 10 ton vessel during lean period and 50 ton vessel during monsoon/rainy season.
- The Hydro-graphic survey in the stretch between Tipaimukh-Jiribam via Lakhipur along Barak River was done during 10th – 14th March, 2011 by a team of Larson & Toubro, Chennai as assigned by the IWAI.
- Provided, the proposal of the state govt. for development of Barak extension with 60 km up stream up to Nungba is considered/sanctioned by the Ministry of Shipping, GoI/IWAI, the state govt. may be in a position to explore and develop a multi modal transit corridor involving the Barak River (IWT/Nungba-Jiribam), NH-37(running through Jiribam starting from Imphal) and the Jiri-Tupul-Imphal Railway Line which is being commissioned in 2-3 years down line as targeted by the NFR.
- This proposed IWT Project would definitely boost the over-all economy of the state and particularly the socio-economy condition of the people in-habitat along the river banks of Barak besides uplifting the standard of living.

Issues on Inter-State Freight Movement:

4.1 The induction of essential commodities including petroleum products is made through NH-39 (Imphal-Dimapur) & NH-37 (Imphal- Silchar).

4.2. However and in compliance of the directives of the Hon'ble High Court of Manipur passed from time to time in c/w PIL No.46 of 2015, maximum permissible tonnage including the

weight of the vehicle are fixed at 25 MT & 24 MT in r/o Imphal - Dimapur sector and Imphal-Silchar sector respectively.

4.3. The restrictions made on maximum tonnage along Imphal – Silchar sector is due to the weak conditions of the 4 bridges namely Irang, Nungdolan, Makru & Barrack and whereas along the Imphal – Dimapur sector, an affidavit has been filed to the Hon'ble Court for lifting the restrictions as recommended by the State Works Department.

Non-Motorised Mode of Transport (NMMT)

A committee under a chairmanship of Director (Transport), Manipur has been constituted for making the Thangal Bazar Stretch fully pedestrianized. The pedestrianization of Thangal Bazar Stretch will involve systematic allotment of parking lots behind the stretch utilizing a 1 km stretch covered Naga Nalah for accommodating 2 wheelers, personal cars belonging to the shop owners/visitors/shoppers with beautification of the stretch under the smart city project. Under this project necessary steps has been taken up for providing street lights to be installed by the MSPDCL with regulation of traffic with declaration of "No Parking" zones and one way traffic system around the peripheral area of Thangal Bazar Stretch besides eviction and sanitization of unauthorised street vendors. The project is targeted to be completed by the end of December 2018.

Road Safety Issues

6.1 **Road accident fatalities:** The state is actively working to contain fatal road accidents with the reduction target of 50% fatalities by 2020 as per the directive of the Supreme Court Committee on Road Safety. During the last 5 years (2013-2017), in average 139 persons killed, 1117 got injured out of 605 accidents with the reduction trend of 11.84% (fatalities), 9.21% (injuries) & 4.75 % (no. of accidents) comparing in between the period of January-June' 2017- 2018.

6.2 **Road Safety Fund:** The present status of establishment of dedicated/non-lapsable pool of **Road Safety Fund** with direct transfer of 50% of the revenue generated from penalties collected from traffic offenders that the Transport Department has already drafted "The Manipur Road Safety Fund Scheme 2018" and the same is examined by the finance department on priority for placing before the state cabinet for vetting shortly.

6.3 **Lead Agency:** Establishment of **Lead Agency** under the supervision of Director of Transport with deputation of dedicated/full timed experienced/professional officers from the other line department is also in the pipeline with formal deputation and posting of one senior police officer of the rank of Dy. SP (Manipur Police Service Cadre). The other line departments namely PWD, Health Services & Education (Schools) are still pursuing for deputation & posting of suitable senior level officers to man the Lead Agency as desired by the CoRS.

6.4. **Driving training schools**: 9 nos of driving training schools are operating/functioning in the state under the license issued by the Department of Transport, Govt. of Manipur.

6.5 **Protection of Good Samaritan:** The central govt. duly framed the guidelines to be followed by hospitals, police & all other authorities for the protection of Good Samaritans as circulated vide MoRTH, GoI Notification No. 25035/101/2014-RS, dated 12th May' 2015 and subsequently Transport Deptt. Govt. of Manipur also issued an OM No. 4/4/2014-T(MV) Case, dated 22nd July' 2016

6.6 **Strict Enforcement of helmet laws:** Mandatory wearing of head gear (helmet) conforming to BIS Standards for every person driving/riding a two-wheeler u/s 129 of MV Act' 1988 and compulsory supply of at least one protective head gear to all the buyers by the manufacturer/dealer of two-wheeler under Rule 134 (4)(f) of CMV Rules, 1989 was notified by Transport Deptt. Govt. of Manipur under memo no. 14/6/2014-T(MV), dated 25th July' 2016. Notification for No Helmet No Petrol was also issued by the Transport Deptt. Govt. of Manipur under memo no. 14/6/2014-T(MV), dated 16th August' 2016

6.7 **Regulation & control of school vans/buses:** Regulation & control of school vans/buses for the safety and convenient of school going children was published in Manipur Gazette Extraordinary No. 385, Sept 22, 2015 under Transport Deptt. Notification No. 12/1/2014-T(MV),dated 14th Sept' 2015.

6.5 **A one day national workshop on road safety** was held on 24th August' 2018 at Imphal as sponsored by the Ministry of Road Transport & Highways, Govt. Of India & All State Transport Undertaking (ASTRU) and about 650 participants attended the workshop.

Nagaland

Introduction

Nagaland Profile:

The State of Nagaland was formally inaugurated on 1st of December, 1963 as the 16th state of the Indian Union. It is located in the extreme North-eastern part of India between 25°6' and 27°4' north latitudes and 93°20' and 95°15' east longitude bounded by Assam in the west, Arunachal Pradesh and part of on the north, Manipur in the south and Myanmar in the east, with an international border of about 296 kms. The topography comprises of hilly terrain, gorge and ridges apart from stretches of plains in the foothills bordering the state of Assam. The altitude ranges from 149 m in the plains to 3048 m by the side of Mt. Saramati and the climatic condition is sub-tropical to temperate with temperature ranging from 4℃ to 27℃, and with average rainfall of 1625 mm.

The state consists of eleven administrative headquarters, inhabited by 16 major tribes along with other sub-tribes. The state capital is Kohima and the largest city is Dimapur.

Being a mountainous state, road transport is the major mode of connectivity for the people. The road network connects about 900 villages to the various district headquarters of the state. The state has only one airport located in Dimapur. The lone rail junction at Dimapur is the only rail link to Guwahati and upper Assam. With funding from the central government, a railway line connectivity till Zubza, a few kilometers from the capital city of Kohima, is being undertaken which will link the capital to the rest of the country through Dimapur.

Need for Comprehensive Mobility Plan or Strategy for the State

Transportation is inter-related with almost every other aspect of regional planning, and affects the lifestyle of every resident in the state. Transportation is often called a “derived demand” because the demand for it arises from other activities that people wish to pursue. Whether an activity creates a transportation need, in turn, depends on where that activity is, in relation to the people who want to participate. This gives rise to the concept of access, which refers to how easily people can reach the goods, services, employment, and events that are of interest to them.

The situation warrants a comprehensive approach that will address and solve traffic congestion, poor air quality, declining public health and social segregation in the state, road accidents and fatalities. Moreover construction and maintenance of roads in the state of Nagaland stands as a colossal challenge as the hilly terrain is prone to landslide, mudslide and flooding especially during monsoon season. The solution also must include all weather road connectivity, technological innovations, infrastructure, emergency preparedness and integrated mobility policies with environmental and land use planning to ensure fuller citizen participation, transparency in decision making and spreading awareness to ensure sustainability. Thus, a comprehensive mobility plan or strategy for the state needs to be prepared which focuses on mobility of people and goods rather than vehicles and accordingly gives priority to pedestrians, Non-Motorized Transport (NMT), all modes of public transport and Intermediate Public Transport (IPT).

Moreover in present day, the urban sprawl in Indian cities has extended far beyond the existing territorial jurisdiction of the city administration and is continuing to spill over into the fringe areas of the cities. Substantial efforts are being made, but cities have been facing difficulty in coping with rapid increase in the number of private vehicles along with improving personal mobility and goods distribution. Therefore emphasis has to be laid on improving the transportation system within the city and integrating it with the land use plan and development of the city.

A comprehensive mobility plan or strategy essentially will identify various actions that lead towards a vision. The Comprehensive State Mobility Plan will address traffic growth of all modes of transportation and will suggest a direction for the multi-modal transport system of state and will improve and emphasize **sustainable transport modes** and will aim to transform the current transport system into a safe, convenient and efficient transportation system across all regions in the state of Nagaland.

Vision

"The State of Nagaland will have a choice of affordable, healthy, sustainable, and connected travel options for moving people and goods through integrated transportation and land use planning."

The Comprehensive State Mobility Strategy seeks to have a short-term, medium-term and long-term vision for desirable accessibility and mobility pattern for people and goods across regions. It focuses on the mobility of people to address state transport problems and promote better use of existing infrastructure (i.e., improvement of public transport, pedestrian and NMT facilities),to provide, safe, secure, efficient, reliable and seamless connectivity that supports and enhances economic, social and environmental sustainability.

The mobility plan seeks to "move people and goods, not vehicles", with a high class sustainable and efficient transport infrastructure that will meet the needs of the growth and development across regions by:

- Seamless integrated mobility system that respond to travel demand and provide shared and economical inter- state, inter-district and intra-city transit connecting urban and rural areas.
- Integrate mobility policies and collective efforts to bring about clean, connected, and safe transport.
- Introduce inland water transport, and,
- Introduce tunnelling projects in the state to enhance passenger and goods movement and overall all socio-economic development.

Objectives

The objective of the mobility strategy is to develop a transportation vision, set goals and objectives based on the defined vision and develop specific actions in the form of short, medium and long term transportation improvement programs that will achieve the transportation vision across regions. In order to attain the vision, the mobility plan seeks to make public transport facilities available to all residents within a reasonable distance from their homes, work places and other destination points. It also seeks to encourage greater use of non-motorized modes by making their use safer.
In order to address the existing and envisage mobility situation by 2030 (12 years time frame) and to fulfil the vision stated above, the following objectives will be aimed to achieve:

- Seamless and barrier-free connections between and amongst modes, convenient transfer facilities, and coordinated timing to minimize delays and make trips more enjoyable
- A healthy regional transportation system supporting comfortable, convenient, and safe opportunities for active living and offers transportation options for all ages and abilities, including people with physical, visual, auditory, or mental disabilities.
- A sustainable transportation system protects air, land and water resources, respects the needs of all people, and uses resources wisely. Promoting walking, bicycling, and transit can lower emissions, and help protect environmentally sensitive areas.
- Move people and goods, instead of focusing solely on vehicles. Vehicles will always be important, but their end purpose is to move people or goods.
- Integrate solutions. There is no one solution to solve mobility problems, but taken together, several different solutions can reinforce each other so that the sum is greater than the parts.
- Different state agencies have different priorities, and must be encouraged to work together so that the decisions of each reinforce the overall aim of mobility strategy
- Integration of land use and transport-connectivity
- Increased use of public transit
- Improved non-motorized and pedestrian facilities
- Improved safety of travel
- Reduction in pollution
- The plan embraces a 12 year horizon (to 2030), but will identify specific strategic actions that can be taken today. These will help “set the stage” for future decisions.

“To accelerate sustainability mobility through advanced technologies and solutions for easier, safer, smoother and seamless mobility for our society “

Accessible Mobility

Making smooth and seamless mobility available.

Smart Mobility

Utilizing unique technologies to improve the way people and goods move.

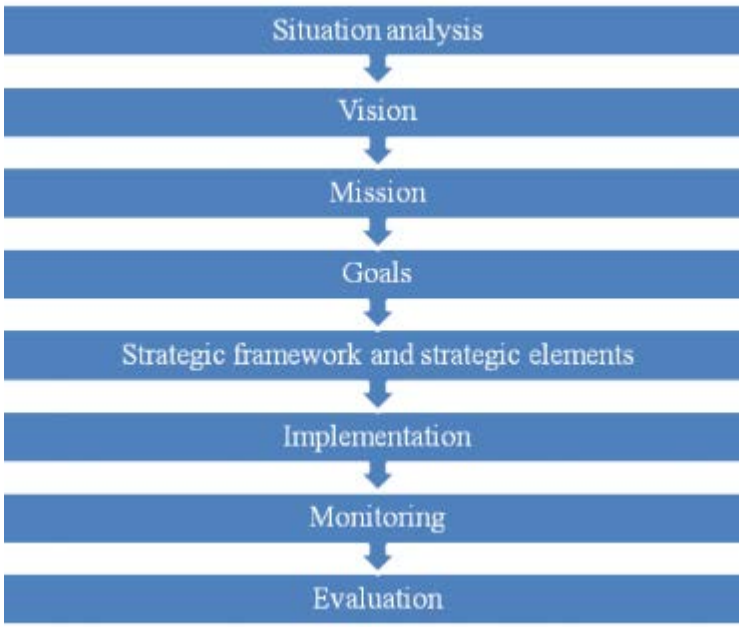
Safe Transportation

Utilizing unique technologies to enhance safe mobility.

Mobility Plan Strategies

Background

The Nagaland State Mobility Strategy Plan is in accordance with the guideline outlined under “**Transforming Mobility” by NITI Aayog** and aims to serve as the basis for implementation of a series of initiatives for fostering sustainable and inclusive mobility growth of the state. In addition, these initiatives will also facilitate state’s economy to leapfrog to attain the status of other developed states in the country. The state mobility Strategy is a twelve year (2030) integrated strategic plan with a concrete policy framework and a well-defined action plan drafted in consultation with all key stakeholders. Within this strategic framework, it aims to give an outline of a comprehensive mobility plan which is economically, socially, environmentally and technologically sustainable and be an integral part of development plans of state, along with its vision, mission, goals, targets, and a way to achieve them. It is planned on a comprehensive situational analysis of the existing mobility scenario of the state in terms of strengths, challenges and opportunities.
The successful implementation of the plan and achievements of its objectives will require participation of all stakeholders from various walks of life that have a direct or indirect influence on the economic development process of the State. The core elements that provide the basis of the plan are eight-fold.



The Mobility Vision Statement

The mobility vision is to ***"Provide safe, efficient, and environmentally sustainable means of transportation system for improving mobility of people and goods"***

Mobility Pillars

The three most important pillars for ensuring sustainable mobility are:

a. Integrated Land use-Transport Planning
b. Bringing a control on movement of personal vehicles
c. Encourage Public Transport System and other Sustainable modes.

Sustainable Mobility however can only be ensured if the solutions are environmentally, socially and economically sustainable.

2.4. The State wide Mobility Strategy Outline

2.4.1 General- Process Oriented:

- An integrated mobility perspective for moving people and goods in an efficient and sustainable manner
- Sustainable mobility infrastructure development and maintenance for improvised connectivity i.e. development of new air strips (taking advantage of UDAN-RCS), and railways with modern infrastructure and technologies along with introduction of Inland Water Transport (IWT) and other feasible modes such as heliports (mainly for medical and emergency services) etc. from state's geographic and terrain perspective.
- Improvement in regional and rural connectivity as well as bridging rural with urban by focusing mainly on road condition improvement (construction and maintenance)
- Encourage low emission, low carbon transit-oriented development program
- Initiating steps for the sustained growth of the electric transport systems (**e-mobility**) in the state (in cities mainly) as a solution to the increasing air pollution
- Regulate growth of personal motor vehicles & management of commercial goods vehicles through travel demand management

- Promote and strengthen the role of car-sharing as convenient and cost-effective alternatives to car ownership, and as solutions for occasional- trip and reduction of vehicle congestion at cities mainly (**Mobility-as-a-Service**)
- Encourage walking, cycling and public transport (Surface) and eco-friendly river taxis (IWT) in cities and regions
- To solve operating problems and adapt to appropriate new technologies, and to introduce innovations to facilitate the need of the special sections of the society such as senior citizens, children, pregnant women and differently-abled persons
- Mass awareness generation, skill development, capacity building to ensure full citizen participation to understand the cause and need of transforming mobility, and the challenges that require collective efforts and responsibility
- Finally an integrated approach by developing of a three tier level architecture such as regional, city and node level with Seamless Integrated Multi Mobility System (**SIM System**)

2.4.2. Technological & Governance Solution Oriented

- ICT enabled public transport (Location Based Services – LBS)
- Command centre for integrated centralize monitoring/ surveillance
- Complete traffic management system integrated with CCTV surveillance
- Complete digitization of vehicle registration process& issuance of driving license
- Parking management system
- GIS based road information management system
- GIS based state wide land use / land Cover mapping (large scale for urban and small scale for rural)
- From Nagaland State Transport (NST) perspective
  - Online ticket booking system integrated with payment gateway
  - Installation of CCTV camera in state buses (Real time monitoring – passenger safety)
  - Handheld ticketing device integrated with web based revenue management application (for check in revenue seepage)
  - Web based inventory management system for NST depots(inclusive of integrated RFID based tagging and searching materials)
  - Automated tracking system for tracking of real time mobility of NST buses
  - Introduction of NST bus service enhancement program (more buses, better rides, shorter waiting times, more comfortable journeys, better connectivity between major towns and the city area)

The Mobility Key Principles

Remoddeling NST/ and STA with innovative infratrsucture & technology and digitalization.	Introducing inland water transport and tunnelling road projects to enhance connectivity between urban & rural areas.	"State task force for mobility" will execute and monitor the state mobility strategy.
Integrated vision and action plan till 2030.	Improved partnerships and collective efforts among key stakeholders.	Financial, human & infrastructural requirement
Promote universal accessiblity of all modes of mobility services with holistic approach towards healthy living and environment regeneration and protection.	Improving safety of driving, cyclying & walking using technological, legislative solutions and awareness drive.	Encourage low transit-oriented development.

"The increase in automobile traffic is a threat to the livability of cities globally and a significant source of carbon emissions. To address this, we need new and more competitive collective mobility solutions."

2.6. The Nagaland State Mobility Intervention - Goals, Targets/Objectives and Timeline

Vision: Seamless Integrated Mobility System that respond to travel demand and provide shared and economical inter-state, inter-district and intra-city transit connecting urban and remote areas		
Goals	**Targets/ objectives**	**Timeline**
Technological & Governance Solution	• ICT enabled Public Transport (Location based services –LBS) • Command Centre for Integrated Centralize Monitoring/ Surveillance • Complete Traffic Management System integrated with CCTV Surveillance • Complete digitization of vehicle registration process& issuance of driving license • Parking Management System • GIS based Road Information Management System • GIS based state wide land Use / land Cover mapping (Large scale for Urban and small scale for rural)	2019 2020 2020 2019 2020 2019 2020
Nagaland State Transport *Intelligent transport solutions & digitization*	• Online ticket bookings through digitization and mobile applications integrated with payment gateway • Introduction of NST bus service enhancement program (More buses, better rides, shorter waiting times, more comfortable journeys, better connectivity between major towns and the city area) • Introducing modern buses for clean transport and improve travel experience of the passengers • Innovative infrastructure and quality maintenance of transit point. • Affordable fare. • Transit point to facilitate the need of the special sections of the society such as senior citizens, children, pregnant women and differently-abled in all the inter-state, inter-district and inter-city transit stations. • Creating livelihood opportunities for local unemployed youths. • Grievance cell at every transit point. • Modernization of minor service and repair stations along the highways. • Installation of CCTV camera in state buses (Real time monitoring – passenger safety) • Handheld ticketing device integrated with web based revenue management application (For check in revenue seepage) • Web based inventory management system for NST depots (inclusive of integrated RFID based tagging and searching materials). • Automated tracking system for tracking of real time mobility of NST buses.	2021 2020 2021 2022 2021 2021 2024 2022 2024 2021 2021 2021 2021
Road connectivity ▪ Smooth road communication ▪ Reduced travel time cost	• Approved and declared highways -government to implement the National Highway network connecting all the districts with two lane highways • The four lane highway from Dimapur to Moreh via Kohima (AH1) • The Nagaland Express Highway: The 4 lane iconic highway from Tizit – Dimapur – Jalukie – Khelma to which the road beyond Tizit to be further connected to the Trans Arunachal	2022-2025 2022 2025

▪ Enable travelers to reach all important destinations within the state and major cities outside the state within the shortest possible time by providing safe, smooth and well-maintained road surfaces.	Highway at Khonsa and the road beyond Khelma to be connected to the Quadrilateral highway that ends at Silchar. • The Trans Eastern Highway connecting the 4 international trade centre (Avangkhu, Mimi, Pangsha & Longwa) along the border of Nagaland and Myanmar • The strategic trade road connecting Avankhu ITC to Assam via Phek, Kiphire, Zunheboto & Mokokchung Districts. • Kiphire Hqrs. to Assam via Mokokchung, the road connects Amahotor- Aghunato- Asuto- Suruhuto- Mokokchung- Chuchuyimlang- Changtongya- Tuli. This is a connectivity concept along segments/ parts of the existing National Highways and other major roads • The WokhaBokajan Road - This is a connectivity along segments/ parts of the existing major roads in Wokha and Dimapur Districts. It also includes a stretch about 10 km of fresh cutting between Meriyan and L Longchem. • Pangsha ITC to Assam ViaMerapani. The road connects Noklak- Chingmei- Tuensang- Longkim- Suruhuto- Atoizu- Akuhaito- Chukitong- Englan- Sanis- Baghty- Bhandari- Merapani. This is a connectivity along segments/ parts of the existing National Highways and other major roads. • The Nagaland central road connecting Pangsha ITC to Dimapur • Ring Road at Dimapur for moderation of Dimapur traffic- Development of Integrated Road and Flyover in Dimapur town. • Ring Road at Kohima for moderation of Kohima traffic – Development of integrated Road, Flyover and Multi-Purpose complex in Kohima town.	2024 2022 2024 2021 2024 2021 2020 2020
Road maintenance: Quality road with inclusion and equity: • Maintenance of existing Road infrastructure to be taken up on priority. • All weather road connecting to all the village in the State • Widening and asphalting of all existing roads, single lane to double lane road	• To implement all the road connectivity as envisaged by the R&B, NH Department, not only a huge amount of money would be involved, but issues like land acquisitions, right-of-way, road reservation, embankments, removal of extortions etc. shall be involved. Therefore, resource mobilization and a positive understanding and healthy mindset of the villagers in whose land the road development will happen is vitally necessary. • Immediate need is the improvement and augmentation of the road connectivity with other urban and sub urban centers and the rural road network. • Smooth road communication and reduced travel time cost will be achieved by 2025. This will enable travelers to reach all important destinations within the state and some major cities outside the state within the shortest possible time by providing safe, smooth and well- maintained road surfaces.	2022 2024 2025
Rail connectivity • Social equity and economic efficiency • Increasing mobility, removing the major barriers in key areas and	To liaise and coordinate with Railways Authority of India for implementation on Railway connectivity in the State. The priority projects are: ▪ Railway connectivity from Dimapur to State Capital Kohima, i.e, Dimapur (Dhansiri)- Kohima (Zubza) New BG Line, 90.35 Kms. ▪ Dimapur - Tizit, 257.19 Kms. Survey done in 2011 ▪ New BG Amguri - Naginimora Line, 29.35 Kms. Survey done in 2006. ▪ New BG Amguri - Tuli 9.15 Kms. Survey done in 2005.	2022 2025 2024 2022

fueling growth and employment.	▪ Dhansiri-Zubza-Kohima to be extended to Imphal/ Moreh for closer Railway connectivity with Myanmar. ▪ Diphu (Assam) to Karong (Manipur) via Jalukie (Nagaland)	2030 2030
Air Connectivity • Improved air mobility	• Development of Chiethu Greenfield Airport at Kohima ✓ the *gateway to ASEAN* ✓ Nagaland at the *hub* of the economies of India, China and South East Asia ✓ Quadrilateral Road ✓ Arterial Road of Asian Highway ✓ Trilateral Highway ✓ Trans Asian Railway ✓ New Growth Quadrangle involving (BIST-EC) o Bangladesh o India o Sri Lanka o Thailand	2025
Air Connectivity - Small Air Field :	**Development of Small Airstrips in all 11 District of Nagaland** ✓promote trade and commerce as well as tourism ✓feeder air-hubs from across the State to the proposed International Airport; and making air travel accessible to one and all.	2025
Vision: Introducing Inland Water Transport and Tunnelling projects in the state to enhance passenger movement and overall all socio-economic development.		
Inland Water Transport • Introduce Inland Water Transport in The State of Nagaland. • Development of Smart River Ports. • Eco-Friendly River Taxis at Lower Transportation Costs. • Training Centers with Focus on Employment Generation and Socio-Economic Development. • Navigation Aid. • Support and Coordination with Private Ferry Operators/ Entrepreneurs.	To liaise with the Inland Waterways of India (IWAI) under the Ministry of Shipping, Government of India for development of the 4 (Four) identified potential inland water ways in the state, that is, ▪ Tizu river from tri-confluence near Longmatra to Avangkhu of 42 km (approx) for Indo-Myanmar; ▪ Dhansiri river from Samjuran to Numaligarh of approximately 110 km for inter-state waterways of Nagaland-Assam; ▪ Dikhu river from Yangnyu to Naginimora, Nagaland of about 52 km for connection to Brahmaputra river in Assam via Sibsagar for inter-state waterways of Nagaland-Assam; ▪ And Doyang river, 61 km length of the river from bridge near Sialmari, Assam for inter-state waterways of Nagaland-Assam.	2024 2030 2025 2025
State Tunnel Transport	• Set up State Tunnel Transport Wing in the Transport Department for identifying the potential tunneling region and undertake feasibility studies. • Assessment of Geological/Geotechnical conditions.	2020

	Prepare Report and monitor Tunneling Projects to enhance connectivity between Urban and Rural areas in all types of weather conditions.	
EVs Transport Wing	• Introduce EVs (small cars) at the state capital, secretariat complex replacing existing cabs. • Introduce EVs (Buses) at the state capital, from the main town to new capital complex. • Introduce EVs (Buses) at Dimapur- the commercial Hub, from the main city to airport. • Introduce EVs (Buses) at Dimapur- the commercial Hub, from the main city to Nagaland University, SASRD Medziphima.	2030
Vision: Application of Space based technology and Geospatial technology for decision support.		
Mobility Information System	• For planning, implementation and monitoring • Geospatial data sharing with line departments • Knowledge partnership with Nagaland GIS and Remote Sensing Centre and other space application centers/ organizations.	2020
Vision: Effective implementation of Road safety Policy		
Human Resource Development Capacity building and Training	• Drivers' Training Institute • Upgradation and standardized Central Workshop, Divisional Workshops and Maintenance Centers and workshops with modern equipment	2021
Note: For a strong and resurgent economic development for the Northeast region, issues like land acquisitions, right-of-way, road reservation, embankments, removal of extortions etc. shall be involved.		

The State wide Mobility Strategy Outline

2.4.2. Technological & Governance Solution Oriented

- Creation of the **Intermodal Passenger Connectivity Database (IPCD)**. A statewide data table of rail, air, bus and ferry passenger transportation terminals. The objective of the IPCD will be to provide data to use in measuring the degree of intermodal connectivity in the passenger transportation system. Therefore, each terminal record in the data base will describe the availability of intercity and transit rail, bus and ferry service along with airline service as well i.e. includes data on the availability of connections among the various scheduled public transportation modes at each facility.

Opportunities that exist in the State

Diversifying Growth Opportunities

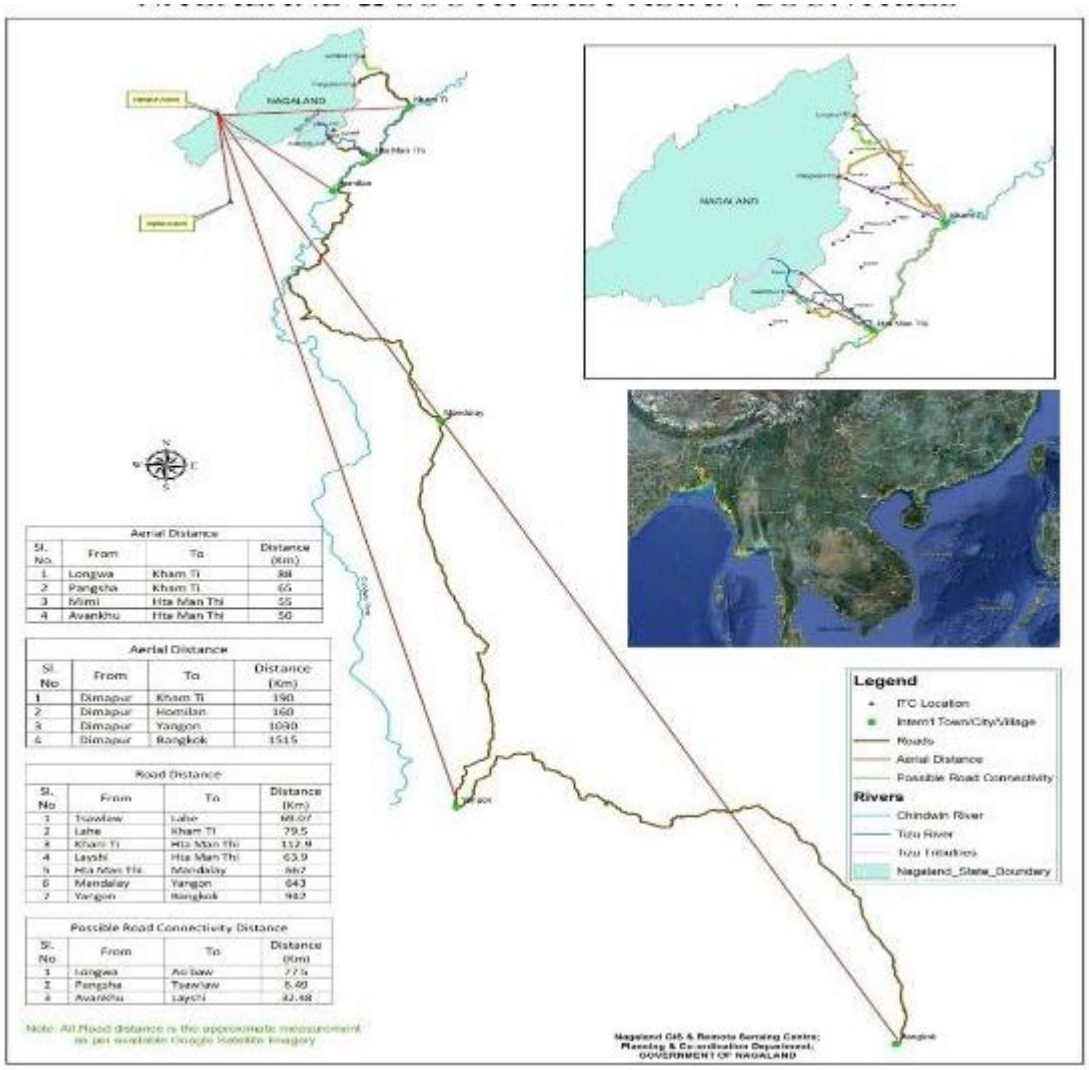
To be socially, and economically sustainable, our country's growth story needs to be inclusive. However, in spite of being endowed with vast natural resources for industrial development and social development, till date Nagaland state remains largely underdeveloped and its available resources are either not exploited or underutilize. A key constraint to the growth of the state has been poor infrastructure and limited connectivity. Thus the region has been experiencing a comparatively slower pace of industrialization and socio-economic growth. Today the region needs infrastructure to support and ensure significant investments and developmental aids.

The region has certain distinct advantages. It is strategically located with access to the traditional domestic market of eastern India, along with proximity to the states in the north-east and adjacent country such as Myanmar, sharing 296 km unfenced border. The region is a vantage entry point for the South-East Asian markets through Myanmar and the resource-rich state of Nagaland with its expanses of fertile farmland and a huge talent pool could turn into one of country's most prosperous regions with more reforms in infrastructure as well as in creating new or alternative avenues of growth, such as, through the development cross-border trade. Opening up and augmenting trade with the neighboring country such as Myanmar and through Myanmar to the other 10 member-states of the Association of Southeast Asian Nations (ASEAN) will help in realizing the full potential of the region.

As more and more new avenues for growth and development emerge, it is of paramount importance that the region embarks on a vibrant journey to realize the dreams of a better future. This vision can be realized only through the combined effort of all stakeholders in the state.

New /Alternative Avenue of Growth: Cross Border Trade

With the emergence of globalization, economic integration among nations has become a necessity. Cross-border trade is the most important medium of the current wave of globalization. The state of Nagaland located at a crossroad between major economies –Southeast Asia and with its strategic geographical location and ground situation, Nagaland is having huge potential for cross border trade which could develop into an international business and trade hub by opening international trade to South East Asian countries via Nagaland. And this is in accordance with "Look East Policy" which has now been turned more meaningfully into 'Act East Policy' as mentioned by the Prime Minister of India, Shri. Narendra Modi, where India seeks economic cooperation with ASEAN and other neighboring countries through the gateway of the North-Eastern Region. This would provide conducive environment for attracting significant investments into the state which will in turn work to attract industries and investments to build a strong and vibrant economy in Nagaland. However, inspite of its geopolitical advantage, this has not really translated into the region's economic development despite the high growth in India's trade ties with Southeast Asia in the recent past, Nagaland's role has been marginal in terms of its contribution to trade and as a trade route. Therefore, in order to benefit from the cross border trade initiatives, infrastructure and connectivity improvements in terms of strategic roads to border areas as well as Integrated Check Posts (ICPs) and border trade points, a seamless river transport system, development of an economic corridor connecting Nagaland with Myanmar, development nodes, border townships, development of a railway network (freight corridor), new airports, etc. need to be developed in the state to become a hub of economic activity and trade for India and the sub region. To this, the State proposes to establish world class infrastructure to connect Nagaland to South East Asian countries. The benefits of such a transformation would be multifaceted, impacting the entire North-East sub region, and would pave the way for the integration of India's North East with the world economy. Admittedly, this is no mean task and calls for massive investments in connectivity infrastructure–roads, railways, airports, inland waterways, etc. apart from other enablers such as industrial infrastructure and basics such as skill development, education etc.



3.3 Creation of development nodes

The first step to attract industries to the region is to improve the industrial, transportation and support infrastructure. Currently, the region suffers from issues such as poor roads and connectivity, inadequate power and storage facilities, insufficient number of custom clearance facilities, inefficiency in handling, etc. These issues are hindering the prospects of serious investments by industrial players in the region. Hence, plan could be made in setting up of development nodes at strategic / potential locations along with Multimodal Transit Transport Corridors connecting the nodes. The integration centres should be designed to provide the following:

- Logistics facilities for trade and movement of goods
- Travel amenities at par with international standards
- The nucleus for up scaling economic activities in the area
- An environment for economic development by the creation of multiple planned urban centres with modern amenities

Further, to promote international trade and commercial activities in the state, five Border Trade Center (BTC) points have also been identified along the international border of Indo-Myanmar. They are Longwa in Mon district, Pangsha in Tuensang district, Mim in Kiphire district, Mohe, Avangkhu in Phek district.

Once set up, the facilities will create alternative urban areas, decongest new cities, promote trade and business, and create job opportunities for people in the surrounding areas. These facilities will also make improved social infrastructure facilities accessible to rural population in the influence areas.

These integrated economic development nodes at strategic points will facilitate industrial development, enable tourism and create the structure for urban development by creating high-impact social infrastructure. This will also facilitate the development of the power potential in the region. The economic development nodes will be self-sustaining townships with highly developed intermodal seamless connectivity (road, rail, air and IWT), reliable power and quality social infrastructure including healthcare and education.

The state government, with support from the town and country planning organizations could include the following in development of border township:

- Residential facilities
- Healthcare facilities
- Higher education facilities
- Trade infrastructure like customs, warehousing, trans-shipment, logistics parks, wayside amenities
- Manufacturing and processing areas

Puducherry

MOBILITY STRATEGY FOR UNION TERRITORY OF PUDUCHERRY

Introduction

The Union Territory of Puducherry consists of 4 regions viz. Puducherry, Karaikal, Mahe and Yanam lying geographically separated from one another. The Puducherry region which is on the south-east coast is about 160 km south of Chennai is the capital of the UT of Puducherry. It consists of 12 scattered areas interspersed as enclaves within Villupuram and Cuddalore districts of Tamil Nadu.

Karaikal region is about 160 km south of Puducherry and it is surrounded by Nagapattinam district of Tamil Nadu. Yanam is located about 840 km north-east of Puducherry near Kakinada in Andhra Pradesh. Mahe region lies almost parallel to Puducherry 650 km away on the western Side near Tellicherry in Kerala.

The Union Territory of Puducherry is 490 sq.km in area with a population of 12.48 lakh as per the 2011 Census. The region-wise break up of population is as follows:

Region	Area (Sq. Km)	Population			Literates
		Urban	Rural	Total	
Puducherry	294	657209(69.2%)	293080(30.8%)	950289	726649(76.47%)
Karaikal	157	98102(49.0%)	102120(51.0%)	200222	154916(77.37%)
Mahe	9.00	41816(100%)	--	41816	39274(93.92%)
Yanam	30	55626(100%)	--	55626	39274(70.60%)
Total	**490**	**852753(68.33%)**	**395200(31.67%)**	**1247953**	**96113(76.94%)**

The Union Territory of Puducherry which is highly urbanized with an urban population of 68.31%, is the third most densely populated state/UT in India with a per-capita income of Rs.1,75,006 as per the 2014-15 advance estimates. The present economy of the Union Territory of Puducherry thrives on secondary and tertiary sector.

The Union Territory of Puducherry has a road network of 2860 km of which 65 km are National Highways, 85 km are State Highways, 39 km are major roads, 288 km are other district roads, and 254 km are rural roads. The road network within the custody of local bodies are 2150 km.

The Union Territory of Puducherry has a rail network of 22 km belonging to Southern Railways. The Puducherry, Karaikal and Mahe regions are served by Southern Railways. Yanam region

has no direct rail connectivity, though can be accessed from Kakinada served by South Eastern Railways. The Union Territory has 9.2 lakh registered motor vehicles as on March, 2016.

The Union Territory of Puducherry has one minor airport at Puducherry and a private port at Karaikal.

Vision for Transformative mobility in UT of Puducherry

Developing Puducherry as healthy and liveable city providing its inhabitants safe, accessible, affordable, and environmental friendly transport system to cater their social, economic, and resource needs resulting in:

- Increasing mobility and accessibility
- Improving environmental quality of city
- Improving road safety
- Developing cost effective transport system
- Social inclusion

The vision of the Government of Puducherry in the sector is to " *Shape a modern, efficient, economical and safe transportation system that balance the needs of the economy, society and the environment and to meet the mobility needs of all sectors of the people by 2036"*.

Situational/SWOT analysis of the existing mobility scenario in the UT of Puducherry

Transport Systems and Travel Patterns

Road:

The Union Territory of Puducherry has a road network of 2860 km of which 65 km are National Highways, 85 km are State Highways, 39 km are major roads, 288 km are other district roads, and 254 km are rural roads. The road network within the custody of local bodies are 2150 km.

Puducherry is served by four main roads which connects to Chennai, Tindivanam, Villupuram and Cuddalore. It is also the terminal of the railway line which connects Puducherry with Southern Railway broad gauge system. The city connected with Chennai through East Coast Road (ECR) and NH 66, Villupuram by NH 45A and Cuddalore by NH 45A.

Railways:

The Puducherry railway line is one of the oldest rail link in India and it was constructed in the year 1879 by the Puducherry Railway Company during the period of French and British rule in India. Under the supervision of South Indian Railway with the object of connecting the town and the port of Puducherry with South India and to develop the resources of the Puducherry territory, the rail link between Puducherry and Villupuram has been established.

The station is operated by the Southern Railway zone of the Indian Railways and comes under the Tiruchirapalli railway division. This division may be the only division in the world maintaining the railways developed by both the British and the French empires. The Union Territory of Puducherry has a rail network of 22 km belonging to Southern Railways. The Puducherry, Karaikal and Mahe regions are served by Southern Railways. Yanam region has no direct rail connectivity, though can be accessed from Kakinada served by South Eastern Railways.

It has daily trains connecting the city with Chennai apart from non-daily trains towards prime cities including Mangaluru, Tiruchirapalli, Bengaluru, Kolkata, New Delhi, Bhubaneshwar and Mumbai via Villupuram.

Feasibility study to link Chennai with Cuddalore via Puducherry (22 km) has been done by Southern Railways. Ministry of Railways is actively considering the above rail link which would cater the needs of inter-city mobility between Puducherry and Cuddalore in future.

Air

The Union Territory of Puducherry has one minor airport at Puducherry. The airport was constructed in 1989. Between 1989 and 1991, regional airline Vayudoot flew to Chennai, Neyveli and Bangalore, however the flights were not successful and all were ended. The airport remained in disuse for the following two decades.

In June 2007, a Memorandum of Understanding was signed between the local government and the Airports Authority of India (AAI) for expansion of the airport. For the first phase, 19.92 hectare of land was acquired at cost of ₹ 18.95 crore. Then the new terminal was constructed and the runway extended by 260m, finally, making it to be 1500 metre runway allowing the landing of ATR aircraft. This phase was completed in late 2012. The second phase of expansion involves acquiring 216 acres of land from Tamil Nadu with an approximate cost of 225 crores to extend the runway by an additional 1,100m allowing larger jet aircraft to land at the airport.

At present Spicejet is operating flights to Bangalore and Hyderabad. The Government of Puducherry has requested Airports Authority of India to revise the plan to the minimum extent of land. The revised plan is awaited.

ANALYSIS AND INDICATORS:

Indicators:

- Public transport facilities
- Pedestrian infrastructure facilities
- Non-Motorized Transport (NMT) facilities
- Level of usage of Intelligent Transport System (ITS) facilities
- Travel speed (motorized and mass transit) along major corridors
- Availability of parking spaces
- Road safety

Analysis:

Existing Level of Service (LOS) for U T of Puducherry

S.No.	Sector	LOS *	Comments
1	Public transport facilities	2	The city has public transport system which may need considerable improvements in terms of supply of buses / coaches and coverage as many parts of the city are not served by it. The frequency of the services available needs improvements. The system provided is comfortable.
2	Pedestrian infrastructure facilities	2	The city has pedestrian facilities which may need considerable improvements. The pedestrian facilities at intersections, availability of footpath etc. need improvements as many parts of the city are not served by it.
3	Non-Motorized Transport (NMT) facilities	4	The city lacks adequate NMT facilities.
4	Level of usage of Intelligent Transport System (ITS) facilities	4	The city lacks adequate ITS facilities.
5	Travel speed (motorized and mass transit) along major corridors	3	Small increase in flow may cause substantial increases in approach delay and hence, decrease in arterial speed.
6	Availability of parking spaces	4	The city authorities need to initiate immediate actions with respect to providing paid parking spaces and demand management for parking.
7	Road safety	4	Need considerable improvements in road design and available road infrastructure, traffic management and in other such reasons which significantly contribute to road safety.

*LOS- Level of Service: 1- High; 2- Average; 3: Below Par; 4- Low

The UT of Puducherry has reasonable public transport facilities and pedestrian infrastructure facilities which needs intervention for its improvement, whereas NMT facilities are in a bad shape which needs immediate attention for its sustainability. However, travel speeds of the personal and public modes are reasonably good. Apart from this, the UT of Puducherry should also focus on the ITS facility to gain the reliability and safety of passengers of public transport.

Opportunities: Target for Future Traffic infrastructure in Puducherry:

Based on the existing infrastructure facility of Puducherry, future targets/ goals have been identified for various service level bench marking components. And the details for which are as mentioned in the table below.

SN	Service level benchmark	Base year		Phase I		Phase II		Phase III		Generic action plan to achieve the target
		LoS achieved	Present situation	Target LoS	Action plan	Target LoS	Action plan	Target LoS	Action plan	
1	Public transport facilities	2	1. The city has good public transportation system provided by private agencies 2. Total no. of city buses operating = 163	1	Frequency increased by 100%	1	Increase in fleet size = 250 buses (413 vs 237)	1	Increase in fleet size = 350 buses (5093 vs 333)	1. Improve the service coverage 2. Increase in frequency to reduce the average waiting time 3. Improving the level of comfort 4. Upgradation of fleet size 5. Organizing PT system
2	Pedestrian infrastructure facilities	2	1. Major signalized junction = 8 2. Lux level is greater than 50% 3. Footpath = only 9% of the network	2	1. Reducing average waiting time at junction by 40 seconds 2. Lux level is greate than 50% 3. Increase in length of footpath = 30% of network vs 9%	2	Increase in length of footpath = 40% of network vs 30%	1	Increase in length of footpath = 50% of network vs 40%	Covering the city with pedestrian facilities
3	Non-Motorized Transport (NMT) facilities	4	No NMT facility	2	1. Increase in length of NMT track = 30 km vs 0 km 2. Provision of parking facility at interchanges = 5 locations	2	1. Increase in length of NMT track = 60 km vs 30 km 2. Provision of parking facility at interchanges = 10 locations vs 5 locations	1	1. Increase in length of NMT track = 90 km vs 60 km 2. Provision of parking facility at interchanges = 20 locations vs 10 locations	1. Covering the city with NMT facilities 2. NMT parking facilities at appropriate locations and interchanges

SN	Service level benchmark	Base year		Phase I		Phase II		Phase III		Generic action plan to achieve the target
		LoS achieved	Present situation	Target LoS	Action plan	Target LoS	Action plan	Target LoS	Action plan	
4	Level of usage of Intelligent Transport System (ITS) facilities	4	1. No CCTV surveillance at interchanges 2. No PIS 3. No GPS installed in PT 4. No synchronization of signals	3	1. CCTV surveillance at all interchanges = 9 2. PIS system at interchanges = 5 3. No. of PT vehicles with GPS = 50 buses vs 137 4. Synchronization of signals = 4 5. No. of PT vehicles with GPS = 50 buses vs 137	2	1. CCTV surveillance at all interchanges = 14 2. No. of PT vehicles with GPS = 100 buses vs 237	1	1. PIS system at interchanges = 10 2. No. of PT vehicles with GPS = 333 buses vs 333	1. Availability of traffic surveillance 2. Provision of Passenger Information System (PIS) 3. Provision of Global Positioning System (GPS) 4. Provision of signal synchronization
5	Travel speed (motorized and mass transit) along major corridors	3	Reasonable good speed of 15-20 kmph	2	With provision of road widening and grade separated junctions	2	With provision of road widening and grade separated junctions	1	With provision of road widening and grade separated junctions	1. Improving travel speed of private and public transport vehicles by proposing road widening, junction improvements, etc 2. Application of ITS at junctions
6	Availability of parking spaces	4	No paid on-street parking	2	1. Enhancement of paid parking for at least 2000 ECS 2. Providing premium parking with ration of 2 times w.r.t. normal paid parking	2	1. Enhancement of paid parking for at least 3000 ECS 2. Providing premium parking with ration of 3 times w.r.t. normal paid parking	1	1. Enhancement of paid parking for at least 4000 ECS 2. Providing premium parking with ration of 4 times w.r.t. normal paid parking	1. Introduce pricing for on-street parking 2. Identifying premium parking areas 3. Provision of off-street parking

SN	Service level benchmark	Base year		Phase I		Phase II		Phase III		Generic action plan to achieve the target
		LoS achieved	Present situation	Target LoS	Action plan	Target LoS	Action plan	Target LoS	Action plan	
7	Road safety	4	50 fatalities per year in road accident	3	1. 25% reduction in accident rate	2	1. 25% reduction in accident rate	1	1. 25% reduction in accident rate	1. Reducing vehicle-km travelled 2. Focussing on safe NMT and pedestrian movement 3. Provision of traffic calming measures and enforcement of rules and regulations 4. Road widening, grade separations, etc.

Challenges and Issues related to Mobility of U T of Puducherry:

The Union Territory of Puducherry faces the following challenges which need to be addressed for the sustainable economic growth of the territory:-

i) Transport infrastructural capacity is inadequate to meet the future travel demands, which will increase the cost of transportation for passengers and goods and endanger the economic growth potential;

ii) Efficiency of logistic services is hampered by lack of suitable multi modal facilities and competent service providers endangering the envisaged economic diversification and consequent sustainability of the economic growth potential;

iii) Increasing urbanization will significantly further pressure the urban mobility system endangering the urban competitiveness;

iv) The role of public transport system has to be strengthened and developed for the affordable and accessibility needs of the bulk of the population and support the opportunities for individual development and consequent economic growth

v) The increasing demand for mobility driven by the envisaged population growth and economic growth is likely to impact the safety of the transport system significantly i.e. more the users, higher the likelihood of accidents and fatalities, endangering the quality of life;

vi) The increasing demands for mobility is also likely to impact the environment significantly through emissions, endangering the quality of life;

vii) Due to high density of the urban population, the land acquisition has been a crucial problem for the development of transport system. Therefore a long term action plan for identifying priority transport development schemes and projects to ensure adequate Right of Way (ROW) and financial resources for timely implementing these transport projects needs to be prepared;

viii) Fiscal constraints have reduced infrastructure spending and therefore for keeping the transport system up to date. The government has to further reform the public finances and increase alternative financing sources for the sustainable development of the transport system.

Objectives and Key Strategic Levers for Transforming Mobility:

The transport system of Union Territory of Puducherry will be designed, developed and managed to fulfil the above stated vision statement for fulfilling the following objectives:

a. Support economic growth
b. Stimulate economic diversification
c. Maintain urban competitiveness
d. Support social inclusion
e. Protect people
f. Protect environment
g. Ensure sustainable spending

STRATEGIES:

The strategy for achieving the above objective would be to promote quality infrastructure support for improving the connectivity and transportation of humans and goods to sustain high growth rate of GDP, to develop integrated and multi-modal transport system with emphasis on mass rapid transport systems such as railways, to promote public transport and requisite quality of service to discourage personalized transport, to promote quality and productivity of goods transportation and infrastructure, to ensure availability of adequate trained manpower, to promote road safety, traffic management and post - accident trauma care, to promote sustainable road transport with special emphasis on energy efficiency, environmental conservation and least negative social impact, to promote increasing use of modern technology and research scientific studies in transport development; and to strengthen the database collection and management system to assist in continued policy and performance evaluation.

SUB-SECTOR POLICIES:

The sub-sector wise broad policy objectives and strategies to meet the desired vision statement are described as under.

Roads:

The Puducherry region is served by NH45A and NH66. The Karaikal region is served by NH45A. The Mahe region is served by NH17 and the Yanam region is served by NH21A. The total length of National Highways is only 65 km out of a total road network of 2860 km. The volume by capacity ratio of all roads are reaching the saturation level due to heavy urbanisation. Almost 90% of the road network have a Right of Way of less than 20.0 m.

Objectives:

- The highways, intra-city and inter-city road network will be developed to national standards with all modern facilities to provide faster connectivity to growth and activity centres in the state
- To ensure proper upkeep of precious road asset and reduce accident risk.

Strategies:

- Lack of adequate Right of Way (ROW) is the major reason for the tardy development of roads in the state. The government will initiate advance and long-term master plans and action plans for identifying the road network system development at regional level and acquire the required ROW in different areas after considering all aspects of existing and proposed land uses in these regions.
- In order to ensure availability of adequate ROW for future road development, the government will freeze construction activities along the proposed road alignment selected for improvement at the existing level. Necessary legal framework will be effected for this purpose immediately.
- The government will take steps for construction of elevated corridors if sufficient land is not available. Necessary fly-overs/ under passes, clover leaf interchanges, bypasses and elevated lanes at vantage locations will be constructed.
- The roads will be developed with equitable allocation of road space. Urban arterial roads will be widened to four lane divided carriageway with provision for median, cycle track, footpath and green cover. Sub-arterial road will have minimum 2-lane carriageway and local roads will have minimum intermediate lane carriageway. Integrated network for pedestrians and non-motorised traffic will be established.
- The government will participate in the central road construction programmes under CRF, PMGSY, Smart City/ AMRUT, NRLEG, economic and inter-state connectivity schemes etc. in a big way without causing delay in project implementation.

(a) Road maintenance:

Objectives:

- The condition of the road affects the vehicle operation cost which is an important component of the road transport cost. If timely maintenance is not carried out, the asset will deteriorate over the period and render service less.

Strategies:

- The government will give top priority to maintain the precious road assets and norms for maintenance of all categories of roads to keep them in good level of service will be notified.
- Government will introduce Pavement Management System (PMS) and Bridge Management System (BMS), mechanization in maintenance, maintenance by contract and corridor management approach for maintenance of arterial and sub-arterial roads under Public Works Department.
- Government will encourage construction of rigid pavement on areas prone to flood and high traffic intensity so as to minimize recurring maintenance cost and obstruction to traffic movement while repairs;

- Government will encourage transferring the responsibility of maintenance of local roads with the people who live on the street or other registered agencies who have interests to put up hoardings/advertisement etc.

Public Transport:

It is well known that public transport occupies less road space and cause less pollution per passenger km than the personal vehicles. As such, public transport is a more sustainable form of transport. The changing composition of vehicle population over time reflects in increasing importance of personalised mode (cars and two wheelers) of transport vis-a-vis public bus road transport mode. While the motorized vehicle population grew at a Compound Annual Growth Rate (CAGR) of close to 35% in the Union Territory of Puducherry, the growth of public transport vehicles is very meagre. Only 0.38 buses are available per 1000 population.

Objectives:

- To revamp public transportation system to increase its share from existing 20% of total passenger traffic to 50% in 2036.
- Reduce dependency on personal transport and increase the share of railways in inter-state and inter-city transport and that of buses in intra-state and intra-city transport.

Strategies:

Inter-city transport:

- The government will encourage rail based public transport system for inter-city travel which is cost effective and environment friendly. In order to strike the appropriate modal balance between public transport and personalized transport, public transport system that is used by common mass will get maximum attention of the government.
- Encouragement will be given for investment in rail-based urban transport systems in congested inter/intra-city routes and introduce high-speed intercity passenger rail service and sub-urban rail system on main line routes.
- Even after construction of rail based mass rapid transit system, the bus transport system will continue to play the role of main mass transport system provider for intra-city routes covering urban core and rural areas in the state. Government will ensure the availability of all category of buses on all intra-city and rural routes at convenient schedules to the public.
- The government will encourage public sector bus transport service provider i.e. the proposed Puducherry Urban Transport Agency (PUTA) and Puducherry Road Transport Corporation (PRTC) with more autonomy to enhance efficiency in operation, management of the system, passenger information system, rationalization of routes and initiating other innovative operational methods to improve its financial viability.
- The operational structure of the public and the private stage carriages system will be further streamlined to attract commuters towards public transport. The government will encourage introduction of new generation cleaner energy buses to reduce the pollution

level. The share of public transport buses in the total stage carriage services will be increased from the present 20% to 50% by 2036.

- Public transport will get preferential treatment in the tax structure as compared to personalized transport.

Urban Transport:

About 70% of the people live in urban area and the divide between urban and rural is getting marginalised due to economic development. Due to lack in proper coverage of public transport services and lack of reliability and connectivity, the personalized transport demand is ever increasing in urban areas.

The narrow urban arterial and sub-arterial roads are flooded with all type of vehicles ranging from buses, trucks, two-wheelers, cars and cycles and the average speed of traffic flow is less than 20 kmph. The buses on these roads are forced to crawl behind auto-rickshaws, cycles or any other slow vehicles due to absence of adequate Right Of Way. This is affecting the economic performance of the intra-city bus transport and the commuters gradually lose confidence in the public transport system and choose alternative costly and unhealthy modes such as parallel services of autos and two wheeler etc.

Objectives:

- Government will take steps to discourage the tendency among people to adapt to personal vehicles and instead encourage mass transport facilities in urban areas.

Strategies:

- Construction of cost effective mass transport systems will get priority in congested city routes. Even if the projects do not turn out financially viable in the short run, the government will provide annuity to bridge the short term gaps in revenue.
- Even after providing mass transport services, the demand for personal transport will be very high in urban regions due to high per capita trip rate and less per capita trip length. The urban transport infrastructure will be planned to meet the long term projected demand of the commuters and other sections of the society.
- Appropriate action will be taken to widen the existing arterial and sub-arterial roads with provision for pedestrian walking and crossing facilities, cycle tracks and off street parking.
- The existing road intersections will be redesigned to enable them to cater to the projected demand. Grade separated fly-overs/under passes will be constructed at all major road intersections which carry more than 8000 vehicles per hour.
- A network of ring and radial roads, bypasses, link roads, fly-overs, multi-level off-street parking facilities, pedestrian crossing facilities etc. will be constructed in cities and towns to relieve traffic congestion around Central Business District (CBD) areas.

(b) Intermediate Public Transport :

Intermediate Public Transport (Para transit) is normally expected to fulfil a need that neither public transport or personal vehicles are able to fulfil. They normally should cater to a category of occasional trips and last mile connectivity trips. But in Puducherry, the para transit is playing a competitive role with public transport system.

Objectives:

- Intermediate Public Transport (IPT) modes such as taxis, auto-rickshaws, share autos, mini-bus/tempo services etc. will continue to play an important role even in future as feeder services to the main mass transport system and providing accessible movement in pre-designated areas. Their operation will be strengthened by proper regulation and discipline.

Strategies:

- The government will encourage introduction of specially designed IPT vehicles such as e-rickshaw and e-bikes for improving road safety and emission levels.
- The government will encourage shared taxis, motor cycle taxis, and other non-motorized vehicles to be used as IPT fleet at selected feeder locations.

Parking:

Land is a valuable economic commodity and parking places occupy large portions of urban land. Due to urban developments, mixed land uses, the demand for on street parking space is growing and almost 40% of the road space is not available for the traffic. Roadside on-street parking takes away much precious road space meant for traffic. Such parking also contributes to accidents and blocking of pedestrian walkways.

Objectives:

- Encourage measures that allocate road space on a more equitable basis for road traffic rather than dead usage of valuable road space for parking purpose.

Strategies:

- Building permits will be issued only after ensuring adequate in-house parking space for parking of the expected number of vehicles of the inhabitants, employees and visitors and in this regard appropriate legislation to prevent the use of the right of way on road systems for parking purposes will be notified.
- For existing buildings and commercial complexes built without providing adequate parking space, such parking facilities will be built off-street by the local bodies at suitable locations and costs recovered from the building owners.
- Open and multi-storied parking facilities will be constructed by the government at important transport terminals, market centres, and multi-modal logistic centres to promote inter-modal transportation.
- Levy of high parking fee that truly represents the value of the land occupied will be used as a means to make use of public transport more attractive.

Rural Transport

The settlement pattern in Puducherry is unique in the country with land islands interspersed with Tamil Nadu lands. The Right Of Way of the roads, both structural and capacity wise, are far from satisfactory level which prevent introduction of buses in these routes.

Objectives:

- To ensure easy access and reliable public transport to all classes of rural society.
- To improve standards of rural roads connecting the villages to allow bus services.

Strategies:

- The policy of the government is to connect all villages/panchayats and settlements inhabited by more than 500 people with bus services. The roads in these areas will be widened to minimum 8 meter standard for extending the bus services.

- Coastal highways and other district roads will be developed to connect hitherto unconnected rural areas and they will be provided with the much needed public transport services.
- Low sized and low capacity mini buses will be introduced in rural low density routes where road width is not sufficient for plying of large or medium size buses. Intermediate Public Transport services such as 4 wheeled cabs/tempos/vans/mini buses (with 5-15 passenger capacity) will be encouraged to serve in identified rural routes as feeder services to the main arterial routes by issuing special permits.
- The fare rate will be determined separately for such mini-bus services in rural areas depending on their financial viability. Govt. will consider giving tax concessions to such vehicles to improve their operational efficiency.
- The government will encourage battery operated/solar powered low capacity vehicles in rural areas by offering special incentives.

Goods Transport:

The economic diversion towards secondary and territory sector has resulted in substantial amount of freight traffic. The demand for construction activities from real estate and other sectors of the economy is also buoyant resulting in higher goods transportation. There is a need to plan for inter-modal infrastructure for goods transportation by creating multi-modal transhipment terminals at goods terminals.

Objectives:

- To ensure high quality goods transport service to the consumers through inter-modal freight transportation and strengthen its infrastructure development.
- Provide barrier free movement of long haul goods vehicles entering the state.

Strategies:

- Goods transport by road/rail/coastal transport system will be modernized to facilitate their inter-modal integration. Multi-Axle Trucks and container transport will be encouraged by creating necessary infrastructure, terminal facilities and wayside amenities for these vehicles and for their parking and servicing.
- Speed governors and intelligent transport system will be adopted for smooth goods movement by road.
- Introduction of green channel will be considered for avoiding unnecessary detentions and harassments of vehicles at check posts. All check posts will be modernized with intelligent vehicle inspecting system to reduce detention period of vehicles for checking.

Private Transport

The car and two-wheeler population is showing the trend of buoyant growth in recent decades and 80% of the registered motorised vehicles are personalised vehicles. Measures need to be taken to discourage use of personalized vehicles both from the angle of road safety, fuel economy and clean environmental standards.

Objectives:

- To arrest the trend for sharp rise in private vehicle ownership in the state and improve driving skills and vehicle fitness to improve road safety.
- To encourage cleaner eco - friendly and energy efficient vehicles and phase out old vehicles that pollute the environment.
- To make issuance of driving license and vehicle inspection strict and IT based so as to reduce scope for subjectivity and extraneous considerations.

Strategies:

- The transport department will be strengthened to make it more as a transport system regulator than mere revenue collection and license issuing agent.
- Model driver training institutions will be established in all regions with requisite infrastructure support.
- Government will strengthen introducing modern web-based database of the vehicles and adopting e-payment scheme for payment of taxes and modern methods of vehicle tracking and monitoring system by establishing necessary control centres.
- Government will set up exclusive wing for road safety enforcement which will work on automated system. Existing other enforcement agencies will also be equally equipped. Emphasis of enforcement will be to smoothen the traffic flow and reduce road accidents.

Road Safety:

Due to friction and conflicts inflicted by the criss-crossing of vehicles such as cycles, pedestrians, slow mode etc., not only the level of service of the roads deteriorated sharply but also resulted in higher accident causalities. Accidents become a common scene on Puducherry roads and major brunt of these accidents are born by cyclists, pedestrians, and two wheelers. On an average annually around 200 people die and around 1500 get hospitalized due to road accidents.

Road accident rate and fatalities are increasing in the state without any abetment. There is an urgent need to control road accidents and gradually bring it down to zero level.

Objectives:

- Reduce the occurrence and severity of road accidents and consequently, the level of fatalities and injuries in an efficient and professional manner.
- Reduce road accidents by at least 50% by 2020 and maintain a zero growth level further.

Strategies:

- The government will strengthen the road safety cell of the transport department with regulatory, advisory, capacity building and research functions to provide an institutional framework for a coordinated approach to prevent road accidents.
- Government will establish necessary infrastructure to carry out routine accident investigations and conduct safety audit of highways and intersections to identify stretches/spots having defective road geometrics and lack of road safety devices.
- Strict enforcement will be done against all traffic violations using IT based intelligent transport devices such as speed radar/cameras, GPS etc. and enhance penalty clauses and amount.
- Inspection & Certification (I&C) of transport vehicles will be made compulsory by covering both safety & emission norms and link registration/insurance of vehicles with I&C.
- Government will encourage private sector participation in rescue, evacuation and trauma care of accident victims for effective delivery of emergency relief services.
- Establishing post - accident trauma care facilities desirably at every 5 to 10 km. radius of occurrence of accidents on National and state Highways.
- Government will encourage NGOs and other expert agencies in spreading road safety messages and conduct road safety awareness campaigns to educate public on safe road user behavior.

Transport Oriented Planning:

According to the objectives of the National Urban Transport Policy the following policy frame work/ guidelines are proposed to be devised as detailed below:

- Public Transport Improvement Plan: Policy and Options
- Non-motorized Transport (NMT) Policy and Options

- IPT/E-Rickshaw Policy
- Policy for Pedestrian Facilities
- Parking Policy and Options

Public Transport Improvement Plan: Policy and Options:

Preparation of an effective public transport system is one of the major tasks of any integrated urban transport study for a city/region. This involves both inter-city and intra-city passenger movement. Intra-city movement plays a vital role in any Comprehensive Mobility Plan. The routing and scheduling of buses as per the demand has to be provided so that the passengers can perform their journey within short period of time and also with minimum number of interchanges. The existing city bus service justifiably lacks in providing an efficient public transport facilities. There is a need to improve the existing system by introducing new routes and the provision of additional infrastructure facilities.

The existing city public transport consists of buses operated by Puducherry Road Transport Corporation (PRTC) and Private Transports. In addition, intra-city public transport is also operated by modified auto-rickshaws within the city centre. Taxis and auto-rickshaws are operating as door to door as intermediate public transport system.

The detailed improvement plans have been drawn up after the goals, constraints and strategies have been discussed with all stakeholders through interactive stakeholder sessions. The strategies discussed with the stakeholders have been developed into an action plan. The improvement plan may be provided with sub-plans that is to be incorporated in the Puducherry public transport improvement plan are provided as under.

- Bus infrastructure plan
- Modal integration plan
- Bus institution and regulatory plan

NMT Policy and Options

NMT modes will get first priority in infrastructure development and funding. Fund allocation for major transport infrastructure will be linked to achieving targets for creating facilities for NMT.

NMT measures will always conform to existing policy at national, state and city level as detailed below. The safety concerns of cyclists and pedestrians will be addressed by encouraging the construction of segregated lanes for bicycles and pedestrians.

- Segregated NMV paths are required not only along arterials but also access roads to public transport terminals. This will increase the use of the public transport system particularly when combined with the construction of NMV parking.
- Activities on footpaths such as street vendors must be properly controlled to secure safety of cyclist and pedestrians.

While NMT infrastructure is not limited to roads, the road network provides a structure for mobility by all modes and therefore needs to be considered in assessing constraints and opportunities for NMT improvements. The road context will influence NMT planning through consideration of the road hierarchy, design, available ROW and traffic characteristics. Engineering design standards strictly based on the road hierarchy may limit design options, and road engineers from relevant government departments will need to be involved in the design process so that creative solutions can be developed within the context of safe operations.

Other structuring elements should also be recognized for their influence on current NMT patterns and potential improvements: public spaces, commercial areas, public transport facilities, and private spaces that are publicly accessible (e.g. shopping centers and parking areas).

Supporting services and programs are just as important as infrastructure in developing the NMT system and ensuring that it is used effectively. There is also a need to consider opportunities for transformation of the transportation system, of urban and rural spatial development, and of local economies. NMT has the potential to play a significant supportive role in all of these, if services and infrastructure are planned appropriately. It is important to:

- Coordinate NMT planning with other plans
- Ensure compliance with statutory processes and plans
- To promote cycling and provide safe pedestrian and cycle infrastructure, it is recommended to have a dedicated NMT cell in Puducherry.

Proposals of non-motorized transport are also related to car free roads. To be successful these require careful planning and are unsuited to many locations. It is generally better to improve walking and cycling conditions by improving non-motorized facilities and traffic calming roads. Due to the limited ROW in the Puducherry city, dedicated cycle tracks may not be feasible options as per the available space. As per the road inventory survey, only 9.1% roads are having 20m-30m RoW. We need to look beyond the cycle tracks and explore other option to increase the share of NMT. One option would be to introduce cycle sharing scheme, connecting the major commercial areas, institutions, market place and residential areas.

IPT / e-rickshaw/e-bikes Policy and Options:

e-Rickshaws/ e-bikes are non-polluting, affordable and flexible transport systems which have a significant role in solving the last mile connectivity issues. Presently, due to the absence of rules and norms, they have been largely operating very informally for which licensing of the same have been recommended by the Ministry of Road Transport and Highways. Policy guidelines are required to treat e-rickshaws as Intermediate Para-Transit (IPT) system, and operate on designated routes acting as feeder to the bus system.

e-Rickshaws shall operate only with the route permits provided by the transport department. Flexibility of service will be allowed in consultation with traffic police and municipal corporations (in Puducherry city and Ozukarai) or block panchayats (in communes). Transport department shall

provide routes for e-rickshaws to operate. They can operate in residential areas and high dense populations, commercial and institutional areas providing the last mile connectivity and may be developed as feeder system for MRTS, LRTS/Mono rails and buses etc., providing them passengers from areas which are unconnected by major transport modes. These systems shall operate within 5 km radius connecting inner roads which are narrow and inaccessible. An operation plan for e-rickshaw shall be developed based on the geography, traffic, and transport characteristics etc. As far as Puducherry is concerned, more than 80% of the vehicle population belongs to two wheeler category. Hence it is proposed to promote e-bikes as non-transport as well as IPT. Specific provisions are required to be addressed through an e-rickshaw policy as listed below:-

- Legal clarity on definition of e-rickshaw and the roles and responsibilities of the stakeholders involved
- Rules framework specifying the efficiency, type, size, speed parameters etc.
- Infrastructural changes required in the urban cities
- Fare cost, standards and penalty clauses
- Ownership and identification procedures

Policy for Pedestrians facilities:

Overview

In India, movement of pedestrians on the city roads with dignity, convenience, pleasure and safety has not received adequate attention. Priority is to be given for pedestrians in planning, development and management of the transport system, since every trip is a pedestrian one at its first and last legs.

Presently 90.7% of the road network of the city has no footpath facilities. 7.4% of the road network has footpath on both sides whereas 1.4% of the roads have footpaths only on one side. This has forced the pedestrians to walk on the carriage-way endangering their lives and hampering the traffic flow. At intersections, pedestrian is put to great inconvenience for want of safe right of way. There is an urgent need to reorganize the priorities in the design, development and management of the city road network system.

Equitable allocation of space to all road users

Planning Guidelines

The planning for pedestrian's facilities in Puducherry needs to promote and facilitate walking. This includes integrated approach to land use transport, collaboration and coordination of efforts to address walking issues, planning, development and design that support walking, provide supportive environment for walking, improve road safety, and address crime and personal security concerns of the pedestrians. The planning of pedestrian facilities should ensure that the pedestrian network is continuous wherein the pedestrians can walk from one place to another without any hindrance, convivial to pedestrians, conspicuous, comfortable to all types of pedestrians, and convenient in comparison to other modes in terms of time and space.

Planning for pedestrian facilities

Tapping the opportunities arising out of the smart city development and tourism projects implementation, it is planned to establish 135 km of non-motorised zone with pedestrian facility within the Puducherry municipality. It is also planned to establish a continuous network of pedestrian walkway over a period of time in a phased manner as shown in table earlier.

PARKING MEASURES:

The design of parking measures should conform to adopted strategy of the city.

- Utilize parking controls to regulate car usage
- Optimize existing parking capacity, before creating new parking facilities
- Prioritize parking in the following order: physically disadvantaged, residents, short-term visitors or commercial activities, long-term parkers such as work commuters
- Improve safety for pedestrians by reducing illegal parking and opening additional public space for pedestrians and cyclists.
- Introduce paid parking as a method to dissuade car use and/or raise revenue
- Utilize fees and fines from parking to invest in the building of car parking facilities and to improve public transport
- Develop Public-Private Partnerships (PPP) for the operation of either on-street or (more often) off-street parking facilities (proposed in smart city project).

MOBILITY PLAN AND STRATEGY:

A Comprehensive Mobility Plan will act as a short and long term solutions for mobility strategies of the Union Territory of Puducherry. The main goal of improved mobility strategies - which include more efficient vehicular traffic, enhanced public transit systems and non-motorized transport - should be to provide safety and security to the users and provide efficient connectivity with accessibility to all sections of the people including tourists, elderly, children, differently-abled, old, and infirm.

The efficiency can also be linked with technology enhancement by provision of cleaner technologies such as CNG, electric buses & IPTs and ITS technology; thereby promoting low carbon transport. With boulevard area being saturated and with the anticipated new growth areas outside in the periphery, the communes in the region is expected to develop. So, the CMP measures shall be formulated in such a way that efficient connectivity and inclusive development strategies can be implemented.

The proposals have been identified into a set of action programs. The action programs include components of short-term, medium--term and long-term measures. The action programs are proposed in three phases comprising:

- Phase I: 2015 – 2020
- Phase II: 2020 – 2025
- Phase III: 2025 – 2036

In addition, interim proposals (implementation within 2 years) has also been laid out as an immediate improvement plan. The interim proposals would require immediate attention and shall have to be implemented on an immediate basis. The key features of interim proposals are as summarized below:

- Strengthening existing bus service
- Identification of city new bus routes
- Regulating auto routes
- Junction improvement plan
- Traffic management schemes
- Model streets (street development plan)

Action Plan:

Possible measures to be undertaken:

Sl. No.	Interventions	Key Action Areas	Implementing Agencies	Deadline
1.	Parking Management	• Exploring new parking sites • Exploring new technologies for maximizing the capacity of parking lots • Creating off-street parking supply • Regularizing parking bays (premium and regular parking fees) • Retro fitting the road cross section to accommodate on street parking	PWD, Municipalities/ Local bodies	2025-2036
2.	Traffic circulation and Management	• Enforcing one-way traffic movement to accommodate on street parking. • Improving road cross sections for the commercial streets to minimize bottlenecks and to optimize road space. • Provide medians along major stretches	Traffic Police and PWD	2025-2036
3.	Pedestrian infrastructure	• Introducing pedestrian crossing at major intersections • Building pedestrian walk network to encourage walking • Creating adequate walkable widths and accessible footpath height along the residential and commercial streets • Providing pelican (signalized pedestrian crossings)	PWD and Municipalities/Local bodies	2025-2036
4.	Traffic Safety & Traffic Education	• Conducting traffic awareness among all categories of road users • Making wearing helmets and wearing seat belts compulsory • Heavy penalty for defaulters	Traffic Police, Transport Department and Education Department	2020-2025

Sl. No.	Interventions	Key Action Areas	Implementing Agencies	Deadline
		• Deploying traffic marshals to increase patrolling		
5.	Efficient Public Transport System	• Increasing frequency of buses in villages during peak hours • Rationalization of IPT routes to cover village areas • Introduction of midi and mini buses	Transport Department	2020-2025
6.	Road Infrastructure	• Taking up of signage study for the Puducherry region • Installation of specific types of signage. • Improvement of road geometrics especially at the intersections and covering of all drains for pedestrian walkways. • Restriction of traffic movement and enforcement through geometrics	PWD and Traffic Police	2020-2025
7.	Tourism	• Introduction of hop-on hop-off buses by tourism department to tourist places • Cycle tracks and cycle rental facilities to be introduced	Tourism Department and Smart City	2020-2025
8.	Rail Infrastructure	• Cuddalore-Puducherry Railway Line. • Additional platform in Railway Station. • Conversion of VIP platform to EMU platform	Southern Railways	2020-2025
9.	Air Infrastructure	• Expansion of Airport - Runway	Airports Authority of India	2020-2025
10.	Inland Waterways	• Inland Waterways-4 as a project to be developed connecting Kakinada of Andhra Pradesh to Puducherry via Tamil Nadu	Inland Waterways Authority of India (IWAI)	2025-2036

Institutional and Regulatory Reforms:

- The State Level Task Force on Mobility has been constituted under the Chairmanship of Chief Secretary.
- The State Level Road Safety Council has been constituted under the Chairmanship of Hon'ble Chief Minister.
- The District Level Road Safety Council has been constituted under the Chairmanship of the District Collectors.
- The Road Safety Cell under Transport Department has been constituted with line departments and fortnightly meeting is conducted to address the road safety issues.
- Regular enforcement activity is being carried out by concerned authorities as per the Motor Vehicles Act/Rules.
- Public out-reach programmes /awareness is being regularly carried out by the Transport Department to educate the general public on road safety aspects.

Proposed Feasibility Study on Mass Rapid Transport Projects in Puducherry:

During the first meeting of the State Level Task Force on Mobility held on 23.07.2018, it was discussed about the feasibility study for implementation of Mass Rapid Transport Projects and also e-mobility options. It was informed that Agence Francaise de Development (AFD), an agency under French Government will be ready to take up the feasibility study. In case the project is feasible the consultancy charge will be reimbursed from the project cost. If not, the cost will be borne by the agency itself. Hence it was decided to go for a feasibility study on Mass Public Transport System in Puducherry. The Finance Department of Puducherry Government had also agreed to the proposed feasibility study.

CONCLUSION:

Puducherry is emerging as one of the main tourist and knowledge hub in South India and with the presence of administrative institutions, growth of the city remain eminent. This can lead to an increase in the vehicular trips and thereby deteriorating the urban environment. So, mobility plan measures will be formulated in such a way that efficient connectivity and inclusive developments strategies can be implemented. With improved mobility between villages and Puducherry city area, the strategies shall support and enhance economic, social and environmental sustainability.

Rajasthan

With rapid growth in population, industrialization and urbanization, demand for mobility has increased manifold for commuting inter-city, intra-city and to remote areas. The state level task force for the state of Rajasthan has been constituted for identifying mobility challenges and suggesting measures to overcome these challenges. The following mobility challenges have been identified:-

- Pollution control
- Congestion
- Infrastructure for multi modal transport
- Public transport service quality
- Road safety

Pollution Control

Rajasthan has been experiencing significant growth in motor vehicles which has resulted in alarming rise in air and noise pollution. Transport Department is developing a web based application for issuance of 'Pollution Under Control' (PUC) certificates to vehicles. This application will also help in monitoring vehicles without valid PUC certificates. Transport Department is also in the process of operationalising E-Challan system to strengthen the enforcement. This system will help in quantifying data and analyzing action against defaulter vehicles including vehicles without valid PUC certificates. State Task Force proposes the following actionable points within a stipulated time line to tackle the menace of pollution by vehicles.

Proposed Actionable Points	**Timelines (Approximate/Estimated)**		
Pollution Control measures	**Phase –I** **All Smart Cities & AMRUT Towns**	**Phase –II** **Towns more than 50,000 Population**	**Phase –III** **All Other Towns**
• Encouraging Green Mobility–NMT (Non-Motorized Transportation),	**Dec. 2020**	**Dec. 2022**	**Dec. 2025**
• Pedestrianization, Dedicated Cycle Tracks etc.	**Dec. 2020**	**Dec. 2022**	**Dec. 2025**
• Creation of separate lanes for Public Transport System.	**Dec. 2020**	**Dec. 2022**	**Dec. 2025**
• Creation of Dedicated Parking/Charging stations for Battery Operated Vehicles/ E-Rickshaws.	**Dec. 2020**	**Dec. 2022**	**Dec. 2025**
• Web based application for issuance and monitoring of PUC certificates	**Dec. 2018**	**Dec. 2019**	**Dec. 2020**
• E-Challaning to check non adherence to PUC scheme	**Dec. 2018**	**Dec. 2019**	**Dec. 2020**

Congestion

Lack of effective public transport system and increasing vehicular density has resulted in congestion. Though effective public transport is important to effectively deal with problem of congestion yet some other ways to manage congestion issue have been proposed in following actionable points.

Proposed Actionable Points	Timelines (Approximate/Estimated)		
De-Congestion Measures	**Phase –I** **All Smart Cities & AMRUT Towns**	**Phase –II** **Towns more than 50,000 Population**	**Phase –III** **All Other Towns**
• Construction of Ring Road and Bypasses to direct heavy traffic entering the city	**Dec. 2020**	**Dec. 2022**	**Dec. 2025**
• Removal of unauthorized construction and encroachments from ROW (Right of Way)	**Immediate**	**Immediate**	**Immediate**
Preparation of Decongestion Plans			
• Demarcation of HDZ (High Density Zones)	**Immediate**	**Immediate**	**Immediate**
• Shifting of wholesale markets and commercial activities not desirable in High Density Zones of the walled city/ core city area	**Dec. 2020**	**Dec. 2022**	**Dec. 2025**
• **Identification and marking of Parking and NO-parking Zones**	**Immediate**	**Immediate**	**Immediate**
• **Identification of vending, non-vending and restricted vending zones in heavy traffic zones**	**Immediate**	**Immediate**	**Immediate**

Infrastructure and Multi-Modal Transport

Transport infrastructure for various modes of transportation is the most vital component in effective transport system that facilitates increasing use of public transport resulting in lesser congestion and pollution. Together with infrastructure, various modes of transportation are necessary to supplement each other in providing the **last mile connectivity.** To deal with the imbalance in infrastructure and various modes of transportation, task force proposes following actionable points.

Proposed Actionable Points	Timelines (Approximate/Estimated)		
Transport Infrastructure Improvement	**Phase –I** **All Smart Cities & AMRUT Towns**	**Phase –II** **Towns more than 50,000 Population**	**Phase –III** **All Other Towns**
• Construction of ROBs/ Flyovers at traffic bottle neck points	**Dec. 2020**	**Dec. 2022**	**Dec. 2025**
• Improvement of roads and street design	**Dec. 2020**	**Dec. 2022**	**Dec. 2025**
• Roads and junction improvements	**Dec. 2020**	**Dec. 2022**	**Dec. 2025**
• Dedicated on-street parking	**Immediate**	**Immediate**	**Immediate**
• Multi-level parking provisions in congested areas	**Dec. 2020**	**Dec. 2022**	**Dec. 2025**
Traffic Calming Measures			
• Reducing road accidents • Identifying black spots and improving Road Engineering	**Immediate**	**Immediate**	**Immediate**
• Inclusion of barrier free planning in public transportation, designing of Safe Pedestrian Paths for senior citizens, children etc.	-	-	-

(*The timelines have not been mentioned for actionable points involving policy decision*)

Public Transport Service Quality

Quality of service and convenience is one of the deciding factors for use of public transport. People will be encouraged to use their private vehicles if the public transport available in their vicinity is untimely, unhygienic, crowded, unsafe, has no convenient waiting area, unavailable at approachable distance from a point, and is overpriced. The possible measures to deal with service quality of public transport could be summarized as below:

- Sufficient availability of transport at regular intervals
- Integrated public transport facilities assisted with information tracking
- Integrated ticketing
- Common mobility card
- Cashless payment options
- Fair and uniform pricing round the clock
- Universal accessibility in public transport

- Covers last mile connectivity
- Wider coverage areas by metro
- Rail /Bus for connecting distant sub-urban and rural areas

Task force proposes following actionable points –

Proposed Actionable Points	Timelines (Approximate/Estimated)		
Public Transport Services Quality			
• Creation of Unified Urban Transportation Authority (UMTA)	-	-	-
• Integrated public transport system in all major cities	-	-	-
• Capacity building of institutions involved in planning and management of urban mobility related works	-	-	-
• Strengthening of urban transport fund to finance transport infrastructure projects	-	-	-

(*The timelines have not been mentioned for actionable points involving policy decision*)

Road Safety

Focus of all these above mentioned measures is shared commuting by using safe system approach for road safety management which is based on the principle that human life and health should not be compromised by our need of travel. It is noteworthy that the Transport Department, Government of Rajasthan has incorporated safe system approach in their Road Safety Action Plan 2018 - 2020.

Various road safety measures have been taken in the state in compliance of directions of Hon'ble Supreme Court Committee of Road Safety, viz., issuance of State Road Safety Policy, constitution of inter-departmental lead agency, creation of dedicated road safety fund, formation of road safety action plan (2018-2020), inclusion of road safety in school curriculum, implementation of activities on all five pillars of road safety according to the action plan etc.

State task force proposes following time line to achieve the target of reduction in road accidents and fatalities.

Year	Target for reduction
2018	15%
2019	15%
2020	20%

The Task force proposes to develop comprehensive transport system to tackle the above mentioned as well as new & unforeseen challenges by creating institutional infrastructure involving various departments, experts/consultants for planning and implementation. It proposes to develop eco-friendly and commuter friendly transport system by using new technology (e.g.-e-vehicles), Information Education and communication (IEC) activities for encouraging non-motorized transport and intelligent transport management system

Tripura

COMPREHENSIVE STRATEGY DOCUMENT ON MOBILITY FOR TRIPURA

1. Introduction:-

The erstwhile princely state of Tripura is located in the extreme south-western corner of North Eastern (NE) region mostly surrounded by Bangladesh (856 km) leaving a chicken neck access to the main land through Assam, Meghalaya and Bengal. The topography of the state is hilly terrain and full of hillocks, rivers and rivulets. Due to its topography, intra-state connectivity was practically absent till pre-independence period i.e. prior to merger with Union of India and the movements were restricted through roadway, railway and waterway through erstwhile East Pakistan now Bangladesh.

2. Vision:-

To provide, safe, connected, shared, secure, efficient, reliable and seamless connectivity (for people and goods) that supports and enhances economic, social and environmental sustainability.

3. Key components of the State Mobility Strategy

Connectivity through Bangladesh:-

3.1 **Access to Chittagong port:-**There are significant gains to be had for both countries from a common market. Access to the Chittagong port and opening up of the inland water route could lead to economic resurgence of the region. In fact, the Chittagong port is only 72 km from Sabroom in Tripura and **could become an important gateway for India to East Asian countries.** The construction of a bridge by India across the Feni River has already been assigned to National Highways and Infrastructure Development Corporation (NHIDCL). Helping Bangladesh modernize the Chittagong port could go a long way in building confidence and goodwill for the benefit of the people of Bangladesh as well as NE states.

3.2**Use of Chittagong and Mongla ports and development of Inland Water Transport (IWT) infrastructure:-**The MOU was signed on 6th June, 2015 between India and Bangladesh for use of Chittagong and Mongla ports for movement of goods and services to and from Tripura. It has the potential of transforming the economy of the region besides providing us an alternative strategic corridor to the NE states. Early operationalization of an agreement is of paramount importance for Tripura and NE region to facilitate the access to ports. With a view to developing IWT for ensuring access to these ports through waterways, the Maharani- Sonamura- Daudkandi stretch of the river Gomati and the Jirania-Joynagar- Ashuganj stretch of the river Howrah should be included as part of the Protocol on Inland Water Transport and Trade between India and Bangladesh. The Ministry of Shipping has already been requested to facilitate technical survey of the above river stretches in Bangladesh so that the IWT development in India and Bangladesh territory occurs in a continuum for ensuring a continuous fairway on these rivers from Tripura extending to the Meghna River system and thereafter to Chittagong Port.

3.3 **Declaration of National Water Highways:-**Declaration of Gomati and Howrah River as National Waterways would be helpful in Inland Water Transport (IWT) development on these rivers. The issue was taken up with the Ministry of Shipping, Government of India to include Gomati and Howrah Rivers in the list of National Waterways for ushering multimodal connectivity through waterways.

3.4 **Declaration of IWT new river Protocol route India and Bangladesh**:-The following river routes of two countries (India and Bangladesh) need to be declared as IWT new Protocol route.

(i) Maharani barrage –Sonamura –Daudkandi (stretch on River Gomati)-Satnal up to the junction with Indo-Bangladesh may be declared as IWT new Protocol route.
(ii) Howrah river stretch –Jirania- Agartala –Joynagar and Titas River/ Ashuganj stretch from its junction with Indo-Bangladesh may be declared as IWT new Protocol route.
(iii) Sabroom –Amlighat stretch of Feni river upto its junction –Chittagong may be declared as IWT new Protocol route.

3.5 **Gomati River** was prepared for quantity based dredging by IWAI. The dredging should be carried out with the provision of assured depth dredging contract instead of quantity based dredging. The IWAI has already been requested to revise the proposal based on assured depth dredging contract and execute the project.

4. Railway:-

4.1. Agartala Akhaura Rail Link Project:-Agartala-Akhaura Rail Link Project (12.03 km) was sanctioned during the year 2012-13 as a follow up to the Memorandum of Understanding (MoU) signed between Govt. of India and Bangladesh on 16.02.2013 for linking Indian Railway network with the Bangladesh Railway network, thereby opening up the access to Ashuganj Port of Call & Chittagong Port for easy movement of goods and services in relation to South – East Asian Trade & Commerce. This will also open up the access to train service from Agartala – Dhaka – Kolkata by reducing existing distance of 1600 km (via Assam) to near about 450 km. This is a cross border rail connectivity, thereby opening up the scope of establishing Katmandu – Kolkata – Dhaka – Agartala – Guwahati Rail Link and later on Guwahati with Bhutan. The project envisages construction of a 12.03 km rail link between Akhaura and Agartala of which 5.46 km is in India and 6.57 km in Bangladesh. The total project cost is Rs. 972 crore (Rs. 580 crore on Indian side, Rs. 392 crore on Bangladesh side). **The timeline for completion of the project is January 2020.**

4.2. Meter gauge link requires to be upgraded to dual/ broad gauge in Bangladesh side.

The rail link from Chittagong Port to Ganga Sagar (125 km) is currently on meter gauge. This meter gauge link requires to be upgraded to dual/ broad gauge for continuous broad gauge connectivity between Agartala –Dhaka and Agartala –Nischintapur- Gangasagar- Chittagong.

The track between Chittagong Port and Dhaka (330 km) is currently on meter gauge. It is learnt that the track between Akhaura and Laksam (65 km approx.) is being upgraded to dual gauge by Bangladesh Railways.

So, it is requested to take up the matter of dual gauge connectivity between Laksam and Chittagong Port (135 km) and between Akhaura and Dhaka (130 km).

4.3 Trans Asian Rail Connectivity:-
Rail connectivity from Jawaharnagar (Tripura) to Darlawn (Mizoram, 109 km) and to Kalay of Myanmar (148 km), altogether 257 km has been proposed. There is existing rail connectivity from Kalay of Myanmar to Singapore via Thailand and Malaysia with 95 km missing link in Thailand (between Dawei and Namtok of Thailand). This may be followed up by Govt. of India for establishing rail link of the NE States including Tripura with Myanmar, Thailand, Cambodia, Malaysia and Singapore.

4.4. Development of Integrated Check Post (ICP) by Land Port Authority of India (LPAI) at Nischintapur:-
A proposal to set-up an Integrated Check Post at Nischintapur was sent to the Secretary, Border Management, Ministry of Home Affairs, Government of India and the Chairman, Land Port Authority of India (LPAI) in December 2017. In January 2018, the Director (Operations), LPAI visited Nischintapur

to examine the feasibilities of setting–up of the ICP. Subsequently, in the 17th meeting of the LPAI held in February 2018 the matter regarding setting-up of an Integrated Check Post at Nischintapur was discussed. It was approved “in principle” to develop the cross border rail link as an ICP. It was also decided that Land Port Authority of India would prepare a detailed plan for the development of facilities and operation at the facility, after interaction with Ministry of Railways, Ministry of DoNER, MEA and state government.

A joint team of officials from Government of Tripura, LPAI, IRCON etc. headed by Addl. Secretary and the Director (I&C) conducted field survey in June, 2018. It was decided during the visit that, LPAI would require about 25-30 acres of land for proposed ICP including cargo handling facilities and also 5 acres will be required by IRCON for realignment of railway track. Accordingly, LAC, West Tripura has prepared a land acquisition proposal. Preliminary survey work has been completed and the proposal (map and land statement) has been submitted by IRCON and LPAI for approval.

4.5. Agartala-Sabroom new BG Line Project (114.39 km):-

Tripura is strategically located and Sabroom on the southern part is 75 km from Chittagong Port, which is the principal maritime port of Bangladesh. To supplement the geographical locational advantage, the broad gauge railway connectivity is being constructed up to Sabroom and is targeted for commissioning in June 2019. The time line for completion of the project needs to be maintained.

5. Air Connectivity:-

5.1. Modernization and upgradation of Maharaja Bir Bikram Airport and declaration as an international airport:-The state govt. has already handed over a quantum of 76.703 acres of land to Airport Authority of India for the modernization and upgradation of Maharaja Bir Bikram Airport. It has spent Rs. 39.63 crore for land acquisition and rehabilitation in this process. AAI is implementing the project for which the AAI Board has approved an amount of Rs. 438.00 crore.

Maharaja Bir Bikram Airport is the only operational airport in Tripura. It is suitable for airbus-320 type of aircraft with runway strip of 2286 X 45 meters. The existing terminal building with peak hour capacity of 500 passengers has already saturated. Maharaja Bir Bikram Airport handled 1.18 million passengers in 2016-2017 with 28.5% growth from the last year. The Compound Annual Growth Rate (CAGR) of Agartala for the last 10 years is 12.6%.

AAI has undertaken construction of New Integrated Terminal Building with a capacity to handle 1200 peak hour passengers at a time with an area of 30,000 sq. m. and Apron for parking of 06 nos. AB-320 type of aircrafts. New terminal is planned to be equipped with 04 nos. aero bridges, multi-level car parking facility and other state of art facilities and services. The target date of completion is by August 2019.

International flights to the neighboring South-East Asian countries shall be operated from the Maharaja Bir Bikram Airport which is the second biggest Airport in NER next to Guwahati, once the Maharaja Bir Bikram Airport Modernization Project is completed and Maharaja Bir Bikram Airport can be declared as international airport.

5.2. Kailashahar Airport:-The Kailashahar Airport, which presently is non-operational, has been taken up under the RCS-UDAN scheme for its operationalization. In this regard, MoU has been signed between Govt. Of Tripura, Govt. of India and AAI on 06.12.2017. Kailashahar Airport has been notified under the RCS-UDAN Scheme on 16th January, 2018. Once operationalized, the airport will provide connectivity on Agartala–Kailashahar–Silchar–Guwahati routes.

6. Road connectivity:-

National Highway in Tripura under Ministry of Road Transport & Highways (MoRT&H) are in progressive stage in order to satisfy the aspiration and long term vision for developing infrastructure in road network in Tripura. The Ministry of Road Transport & Highways (MoRT&H) has supported this strategic goal by notifying 6 (six) roads (total 853.81 km) as National Highway (NH-08, NH-108A, NH-108B, NH-208, NH-208A & NH-44A) and declaring 4 (four) State Highways (229.25 km) as 'In-Principle' National Highway.

Geographical position in Tripura is now considered as gateway of South-East Asia and Central Government has a vision to follow Act East Policy in North Eastern region. The state is also critically located from a strategic view point as 85% of the border is surrounded by Bangladesh which in the context of the 'Act East' vision of the government and can be a significant opportunity as Tripura is the only State in the NE Region with connectivity to Bangladesh at different border locations. Therefore, further development of road network is very essential to connect the state capital, district H.Q, tribal areas, backward areas, tourist places etc. and also for national and international connectivity and trade. **Accordingly, proposal for declaring further 8 (eight) State Highways as National Highways has been submitted to MoRT&H on 5th August, 2017**. List of these roads is given below:-

6.1 Notified National Highways in Tripura (6 Roads):-

Sl. No.	Name of NH	Section	Length in km
1	NH-8(44)	Churaibari – Agartala	198.00
		Agartala Bypass (Khayerpur to Amtali)	12.00
		Amtali to Sabroom	121.91
2	NH-44A	Manu to Simlung	134.00
3	NH-208	Kumarghat to Kailashahar	24.75
		Kailashahar to Sabroom via Khowai, Amarpur	240.25
4	NH-208A	Kailashahar to Kurti bridge (Tripura-Assam border)	45.00
5	NH-108B	Khowai to Agartala	55.00
6	NH-108A	Jolaibari to Belonia up to Bangladesh Border	22.90
		Total	**853.81**

6.2 'In Principle' declared National Highways in Tripura (4 Roads)

Sl. No.	Section	Length in km
1	Kamalpur to Santirbazar (on NH-8) via Ambassa (on NH-8), Gandacherra, Amarpur (on NH-208)	148.00
2	Santir Bazar to Belonia	17.25
3	Champaknagar (Jirania) on NH-8 Udaipur on NH-8 via Khumlung and Jampuijala	40.00
4	Amarpur on NH-208 to Udaipur on NH-8	24.00
Total		**229.25**

6.3 Proposed New National Highways in Tripura (8 Roads):-

PHASE -I

1. From Amtali Bypass (NH-08) to Sabroom (India- Bangladesh Border) – via Hapania - Ashwinibazar – Madhupur – Durganagar - Boxanagar-Sonamura-Kathalia- Belonia- Hrishyamukh- Srinagar-Amlighat- Manughat. Length-154.00 km
2. From Dharmanagar (NH-208A) to Khantlung (Tripura-Mizoram Border) – via Panisagar – Jalebasa – Kanchanpur – Anandabazar - Bhandarima-Setudwar. Length 100.00 km
3. From Chailengta (NH-44A) to Jatanbari (NH-208) – via Arundha-Champarai- Maldapara-Bhagirath- Raishyabari- Tirthamukh Power Plant. Length-122.00 km
4. From Mohanpur (NH-108B) to Bhagirath BOP (India-Bangladesh Border) – via Mandai – Jirania - ADC HQ Khumlung – Lamphu – Ompi –Rabanpara - Jagabandhupara. Length-110.00 km.

PHASE-II

5. From Jalebasa to Kampui (Tripura-Mizoram Border) – via Hmanchuang-Damcherra-Hmanpui-Vangmun-Fuldansai. Length-91.00 km
6. From Bisramganj (NH-08) to Sonamura (India-Bangladesh Border) – via Melaghar. Length-24.00 km
7. From Udaipur (NH-08) to Kathalia (India-Bangladesh Border) – via Kakraban-Mohanbhog-South Taibandal- Thulibari- Manaipathar. Length-55.00 km
8. From Santirbazar (NH-08) to Karbook (NH-208) – via Bagafa School. Length-26.00 km.

6.4 Bhutan, Bangladesh, India and Nepal (BBIN):-

More emphasis may be given on the implementation of Bhutan, Bangladesh, India and Nepal (BBIN) Motor Vehicle Agreement. This will facilitate passenger as well as goods movement between the countries. The following routes were proposed during the meeting of Bangladesh, Nepal and Bhutan:-

For regular and non-regular passenger transport:-

i. Agartala-Akhaura-Sarail-Narsingdhi-Dhaka-Benapole-Petrapole-Kolkata.
ii. Chittagong- Ramgarh- Sabroom- Agartala- Chatlapur- Shamshernagar-Moulavibazar- Sylhet.

For personal vehicles:-

i. Tripura – Bangladesh

7. Land Custom Stations (LCS):-

In Tripura, there are 7 (seven) Land Custom Stations (LCS) and one Integrated Check Post (ICP) bordering Bangladesh for trade and passenger traffic. Out of these, 5 (five) Land Custom Stations and one Integrated Check Post are operational. Details are given below:-

i. Integrated Check Post- Agartala-Akhaura to Ashuganj River Post;
ii. LCS, Srimantapur-Bibirbazar to Comilla (connecting to Biswa Road)
iii. LCS, Muharighat –Belonia to Feni (via Parshuram)
iv. LCS, Khowai- Balla to Chunarghat
v. LCS, Manughat (Kailashahar)- Chatlapur to Moulavibazar/ Sreemangal
vi. LCS, Old Raghna Bazar (Dharmanagar)- Paschim Batuli to Maulavibazar / Jaifarnagar
vii. LCS, Dhalaighat (Kamalpur)-Kumarghat to Maulavibazar/Sreemangal
viii. LCS, Sabroom-Ramgarh to Chittagong Port (via Bibirhaat)

LCS –Manughat: About 1.50 km from ICP, Manughat to Chalta and Chatla to Samsherngar about 8.00 km is required to be developed. Besides, RCC Bridge need to be constructed near Chalta. In India, road of about 900 meter from RKI school to Manughat LCS via Maszid needs to be developed.

LCS –Old Raghan Bazar to Paschim Batuli: Road on the Bangladesh side from Pschim Batuli needs to be widened. At present, the length of the road is 50 meter and width of the road is 10 ft.

A special package may be introduced for development of infrastructures facilities in both India and Bangladesh so as to promote trade between the two countries.

8. Information Technology (IT):-

(i) **SEZ for IT & ITeS:**-The state govt. would like to harness IT & ITeS to generate employment to unemployed youth and fully utilize the potential of technical education institutions by setting up an exclusive Special Economic Zone (SEZ) for IT and ITeS in the state. The Govt. of India may kindly consider to sanction.

(ii) **IT Park**:-STPI has set up IT parks at two locations which are having a combined capacity of 287 seats and 10387 sq. feet raw space. As the seats /space are expected to be occupied very soon, the state govt. intends to set up another IT park. Land in this regard is being identified. STPI may be requested to set up another IT park of at least 6oo seats.

(iii) **State Data Centre (SDC)**:- Tripura SDC project set up in 2010, was given Administrative Approval for Rs.40.05 Cr. from Govt. of India (GoI) but only Rs.26.19 Cr. has been released to the State. Most of equipment installed in SDC are nearing end of support. All equipment needs to be replaced immediately. Further, space for new data centre has been constructed and data centre has to be migrated to the new place.

(iv) **State Wide Area Network (SWAN):-**Tripura SWAN was set up in 2009 with financial support from GoI. Financial support for maintenance of SWAN was discontinued in 2015. All equipment is nearing End of Support (EoS).

(v) **Centre of Excellence on Open Source software**:-Open Source Software (OSS) are available free of cost, but production support for the software involves substantial amount. Promotion of OSS is necessary for IT proliferation in rural area. The state govt. would like to set up Centre of Excellence (CoE) for open source solutions to give support to the users.

(vi) **Centre of Excellence (CoE) on Cyber Security**:-Cyber security is important to protect ICT infrastructure from cyber threats as North East region is striving to develop infrastructure and manpower in cyber arena. It is important to impart cyber security skills so that infrastructure is protected and trust of people in cyber space is enhanced. Therefore, a CoE in cyber security may be set up in NIELIT Agartala centre to work in this area.

(vii) **Digilocker Integration with e-District Services**:-For the integration of e-District services with Digilocker, the process has already been initiated. However, in order to reap the benefits of Digilocker, the integration may kindly be expedited.

(viii) **e-Sign**: The state govt. has selected service plus framework developed by NIC for e-District application. e-Sign is yet to be integrated with Tripura e-District application though NIC is working on it. This may kindly be expedited.

(ix) **UMANG integration with e-District Services**: - For the integration of e-District services with UMANG, the process which was initiated in December 2016 by Tripura, is yet to be completed. This may kindly be expedited.

(x) **Dedicated International Gateway (IGW):**

Dedicated International Gateway (IGW) at Agartala has been commissioned on 23rd March, 2016 extending 10 Gbps international internet bandwidth from Cox Bazar, Bangladesh. At present the IGW bandwidth has been catering only international internet traffic of Tripura as well as other NER states. It has been informed by BSNL that only landline broadband, leased-line internet, Fiber to Home (FTTH) and Wimax is integrated with IGW which covers only around 9000 BSNL customers. BSNL mobile data service is not yet integrated though the number of such users (around 3 lakhs) is much more than other type of BSNL internet users. In order to extend the benefit of this IGW to BSNL, Gateway GPRS Support Node (GGSN) needs to be installed at Agartala. At present GGSN is installed at Kolkata for catering North

Eastern region and Eastern region. **Further, it has been intimated by BSNL that they are not in a position to install the GGSN equipment at Agartala due to techno-commercially non-viability. Therefore, BSNL, Tripura may be made full-fledged.**

9. Key aspects of mobility strategy:

(i) Understand the present travel characteristics and forecast travel demand for the planning horizon.

(ii) Understand the present travel characteristics and forecast travel demand for the planning horizon

(iii) Work out the mobility plan which is economically, socially, environmentally and technologically sustainable and be an integral part of development plans / master plans.

9.1. Key issues facing the transport sector:

(i) Promoting universal accessibility of all public mobility services and public spaces
(ii) Improving efficiency through integration of modes

(iii) Increasing access to services

(iv) Electrification of public transport systems

(v) Low carbon transport.

9.2. Integrated vision for the transport sector till 2030:

(i) Development of a three tier planning approach- Regional level, State level and District level (HQ cities)
(ii) Seamless Integrated Mobility System (SIM System).

9.3. Development of sustainable mobility solutions with focus on electrification and inter modal connectivity: Electrification of public transport systems, personal transport options and inter-modal freight and passenger transport.

9.4. Institutional requirements and electrification of public transport:

Year	Institutional	Electrification of public transport
Phase-1 (2019-21)	1) Set–up State Nodal Authority to supervise the State Mobility Plan 2) Define roles and responsibilities of the nodal agency	1) Regulatory policy to incentivize private electric vehicle aggregators for both surface and water transport 2) Procure electric fleet- buses, rickshaws, cabs, ferries
Phase-2 (2022-26)	Dedicated State Mobility Fund for infrastructural/ technological improvements	1) ICT enabled public transport. 2) Command Centre for integrated monitoring / surveillance
Phase-3 (2027-30)	Integrated payment system across all modes of transport	Integrated Transport Management System to streamline traffic flow

9.5. Initiatives taken by the Government so far under transport sector:-

(i) **App based taxi/auto/bike services:-**Transport Department has already taken decision to introduce these services in the state. The Rules on Tripura on Demand Transportation Technology Aggregator (TODTTA) Rules, 2018 has been notified.

(ii) **Electric bus service:-**Transport Department is examining the proposal of Indo-European Sustainable Development and Energy X for running electric buses on the roads of the state on PPP model. They may have an agreement with the TRTC for running the Buses. The state government shall provide suitable locations for installation of charging points by that company.

(iii)**Exemption of road tax for electrical vehicles:-**To popularize use of electrical vehicles, the state government has already taken decision to exempt road tax for the electric vehicles.

Uttar Pradesh

Introduction

Uttar Pradesh is the most populous state of India with a total population of 19.96 crore according to census, 2011 out of which 15.51 crore live in the rural areas and 4.45 crore in the urban areas. There has been a net addition of about 1.09 crore persons in the urban areas between 2001 and 2011. Thus, about 16.50% of the total population and 11.80% of the urban population of India reside in Uttar Pradesh.

Being 4th largest state of India, Uttar Pradesh has 18 divisions, 75 districts, 915 urban bodies, 8135 Nyaya Panchayats. 13 Municipal corporations, 226 municipal boards, 59163 gram sabhas, 822 development blocks and 97941 populated villages. Its largest cities include Lucknow, Kanpur, Agra, Varanasi, Allahabad, Ghaziabad and Meerut.

Being the 4th largest economy of India, Uttar Pradesh is primarily dominated by the tertiary sector, followed by primary and secondary sector. The state has the highest number of Micro, Medium and Small enterprises (MSMEs) in India and is amongst the top five manufacturing states in India contributing more than 8% of national manufacturing output.

The tertiary sector has been driven by trade, hotels, real estate, finance, insurance, transport, communications and other services. Uttar Pradesh is one of the most favored state for tourists in India and is ranked second (2016) in terms total tourist arrivals. In 2016, 3.156 million foreign tourists visited the state of Uttar Pradesh. The tourism industry has significant contribution to the state's economic growth.

With new wave of economic development and spur in manufacturing in India, Uttar Pradesh is leading the stride in industrialization. Alongside, UP is undergoing a rapid urbanization. Most of the planned smart cities in India are in Uttar Pradesh. Further, the state is emphasizing on last mile connectivity in rural areas. With all this, mobility plays a vital role in spurring the economic activities in the state.

This document, *Uttar Pradesh Mobility Vision 2030*, serves three primary purposes:

a. Establishing a vision for the future of UP's mobility system
b. Setting up strategies for achieving the vision
c. Proposing an action plan for implementing strategies

Vision for Transformative Mobility

"By 2030, the Government of Uttar Pradesh is committed to ensure last mile connectivity and provide inter-modal, shared, clean, safe and economical transportation to the people across urban and rural regions. The state envisions to mobilise the industrial strengths and connectivity advantage by embracing new-age business models and next generation technologies to boost economic activities in the state."

Existing Mobility Scenario in Uttar Pradesh

- Connectivity is an absolute necessity for ensuring access to markets and achieving greater economies of scale leading to higher growth and living standards. The long term strategy of the GoUP is to create a connectivity web of air, water, road and rail network that will help the state's industries and manufacturing units switch seamlessly between different modes of transport as they send their goods to markets in India and abroad.
- In addition to this, the GoUP also recognizes the importance of creating a world class digital connectivity framework in the state. In order to devise a State Mobility Strategy Plan, it is important to understand the existing baseline transport scenario in the state and highlight the key trends with respect to both passenger and freight mobility, emerging issues, and current and future transport strategies and initiatives that are already in place.

Road Transportation:

- The total road length in UP currently stands at about 412,422 kms (2015-16, MoRTH). This can broadly be divided into a core and a non-core network. The core network comprises of the national highways and state highways, while the balance constitutes the non-core State Highways, major district roads, other district roads and village roads.

Figure 4- Road Network in UP

- Uttar Pradesh is known for its expressways, enjoying seamless connectivity through six lanes and access controlled expressways. State already has 165-km long Yamuna Expressway and 302 km long Lucknow Agra Expressway, connecting Delhi NCR to the State capital - Lucknow. The upcoming 343 km Poorvanchal Expressway and 293 kms of Bundelkhand Expressway will connect the state capital further to eastern and central India, respectively. The state also has a dense network of 4 lane and 6 lane highways.

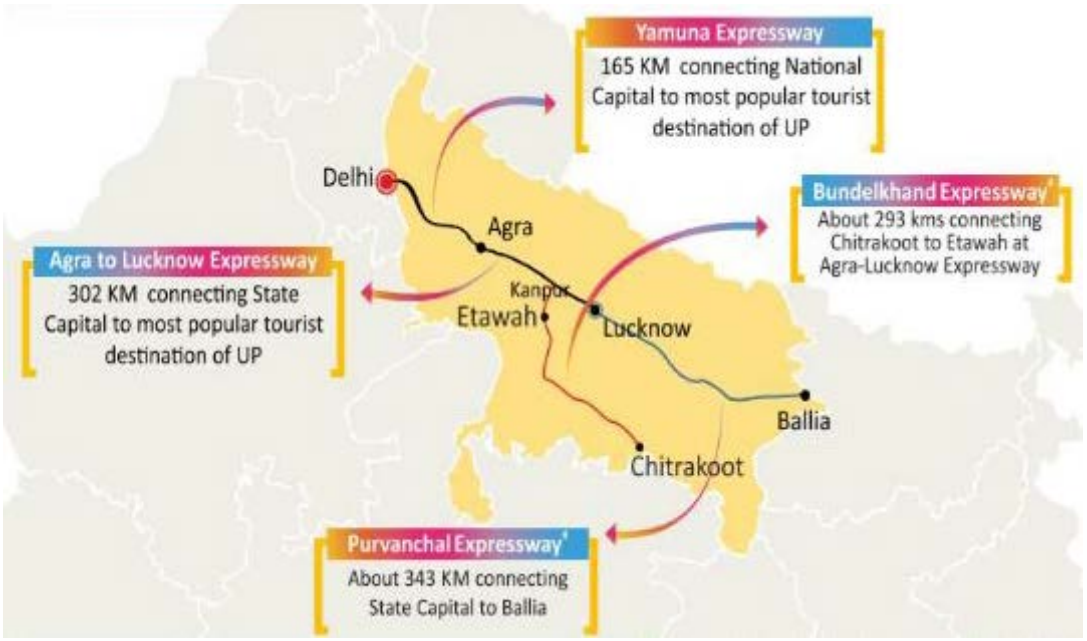


Figure 5 - State Expressways in Uttar Pradesh

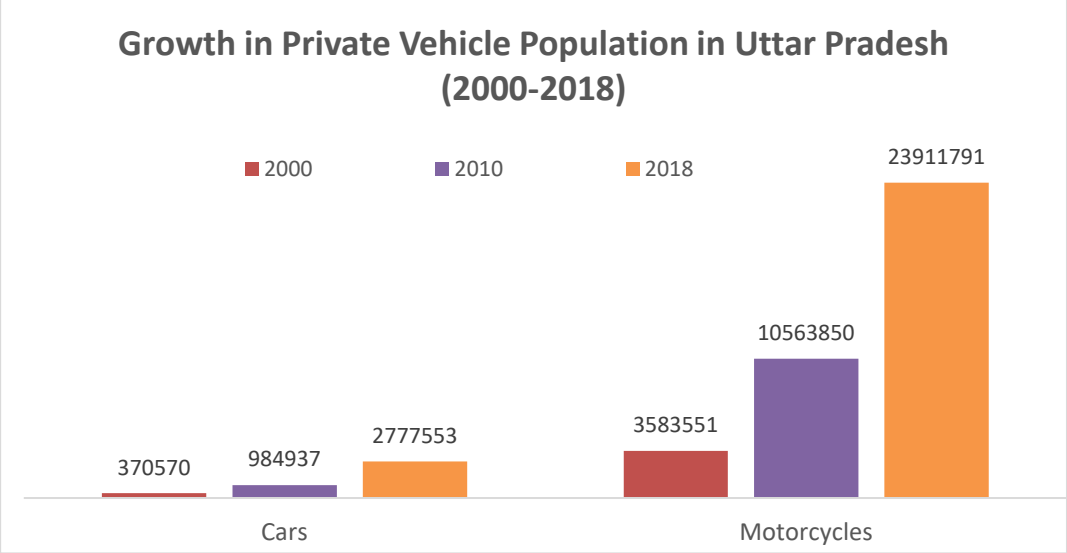
Vehicle population

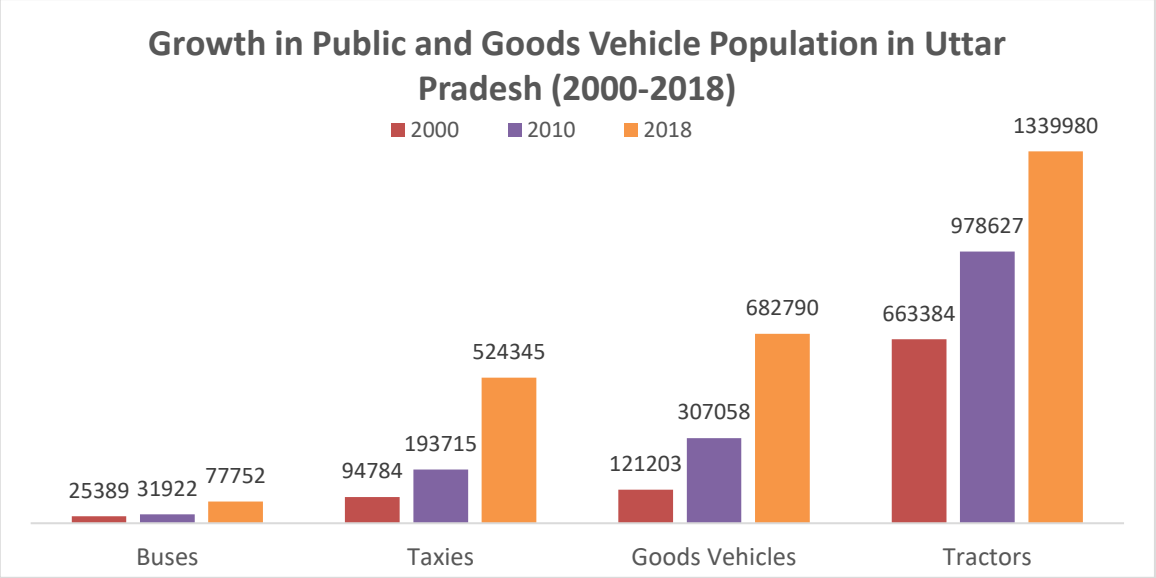
Vehicle population in Uttar Pradesh has increased may fold in past two decades, particularly since 2010. There has been significant rise in the number of private vehicles, particularly 2-wheeler motorcycles and cars. Also, there has been significant increase in total number of buses, taxis, goods vehicles and tractors. Overall, between 2010 and 2015 there has been 80% rise in the total vehicle population in Uttar Pradesh. On an average, yearly 30 lakh vehicles are added on roads in Uttar Pradesh.

NUMBER OF VEHICLES PLYING ON ROAD IN UTTAR PRADESH

Year	Cars	Motor Cycles	Buses	Taxies	Goods Vehicles	Tractors	Others	Total
1	2	3	4	5	6	7	9	10
1995	131848	2057408	28740	62861	78770	447546	131255	**2938428**
2000	370570	3583551	25389	94784	121203	663384	138959	**4997840**
2005	615739	6083655	26549	119789	184428	791411	167563	**7989134**
2010	984937	10563850	31922	193715	307058	978627	227123	**13287232**
2015	1746117	19258791	57939	380024	562503	1276927	654065	**23936366**
2018	2777553	23911791	77752	524345	682790	1339980	80605	**29394816**

Source: UPSRTC Statistics





Railways

Uttar Pradesh has the biggest railway network in the country and various parts of the state are catered to by five of the 17 railway zones in India. These are Northern Railways, North Eastern Railways, East Central Railways, North Central Railways and West Central Railways, the Northern and North Eastern Railways have Lucknow as their main junction. Intra-state rail network is well developed, connecting the towns and the district headquarters of Uttar Pradesh.

Figure 6 - Rail Network in UP

The Delhi Metro Rail links Noida and Ghaziabad with Delhi. Delhi-Ghaziabad-Meerut Rapid Rail Transit Corridor project (RRTC) has been cleared by the Board of National Capital region, at an estimated cost of US$ 3.34 billion. The corridor would be built between Sarai Kale Khan in Delhi & Modipuram in Meerut, where the trains can run up to a maximum speed of 180 km per hour, thus bringing down the travel time from Delhi to Meerut by 60 minutes.

Inland Waterways

Cargo movement through waterway is considered the cheapest mode of transportation internationally. However, cargo movement is very low in India compared to the international scenario. Considering such a large potential and demands, IWAI has initiated the project of “Capacity Augmentation of National Waterway-1” between Haldia and Allahabad named as “Jal Marg Vikas Project”, connecting Allahabad to Haldia (1,620 kms), of which 370 kms falls in UP (Allahabad – Ghazipur) The development of NW-1 would result in an environment friendly, fuel- efficient and cost-effective alternative mode of transportation, especially, for bulk goods, hazardous goods and over-dimensional cargo.

National Waterways No. 1

NW-1 originates from Uttar Pradesh

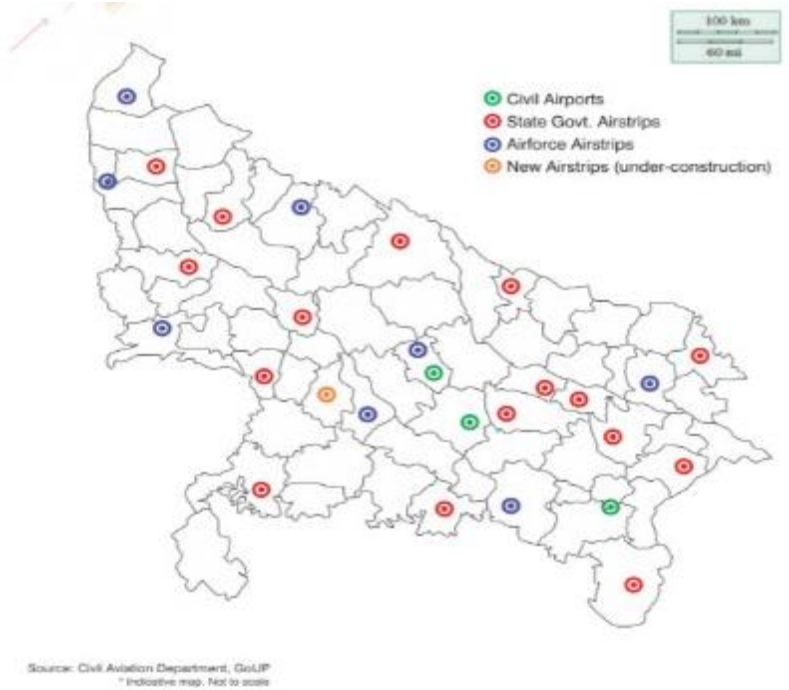
NW 1
Ganga
(Allahabad to Haldia)
1620 km

States served:
UP, Bihar, Jharkhand, West Bengal

Airports

The passenger air traffic in Uttar Pradesh has grown in the year 2016-17 by 30% to 6.1 million passengers on a year on year basis whereas air cargo has witnessed a negative growth from 5.91 MMT (million metric tons) during 2015-16 to 5.89 MMT during 2016-17. Uttar Pradesh has two international airports in Lucknow and Varanasi, four domestic airports in Agra, Kanpur, Gorakhpur and Allahabad. These airports provide interstate and intrastate air connectivity. Lucknow airport serves 65% of the passenger air traffic demand in UP followed by Varanasi 32%, Allahabad 2.4%, Gorakhpur 0.9%, Agra 0.2% and Kanpur 0.1% (2016-17).

Uttar Pradesh is the least penetrated aviation market in India, 0.031 per capita air strips in comparison to the national average of 0.4, and 0.3 in China and 2 in the United States. This points to a significant and under exploited investment opportunity in the state. (Source: http://upinvestorssummit.com/htm/01/img/pdf/sector/Civil.pdf)



Within the Regional Connectivity Scheme (RCS), there are eight more airports that have been planned in Aligarh, Azamgarh, Barreily, Chitrakoot, Jhansi, Moradabad, Sonabhadra and Shravasti. To strengthen the tourism sector in the state through air connectivity, the state is considering constructing helipads in Mathura, Vrindavan, Deogarh, etc.

Passenger & Aircraft movement in Uttar Pradesh (2016-17)		
Airport	Passenger traffic (nos)	Aircraft movement (nos)
Agra	11,014	312
Allahabad	45,015	856
Gorakhpur	54,012	909
Kanpur (Dehat)	3211	146
Lucknow	39,68,950	29,356
Varanasi	19,16,454	15,035
Source: Department of Civil Aviation, GoUP		

Urban Transport

Urbanization and urban transport in the state are imperative for achieving faster and more inclusive growth because agglomeration and densification of economic activities in urban areas stimulate

economic efficiencies and provide more opportunities for earning livelihoods for both rural and urban dwellers.

Intra city bus services

Many cities in UP like Lucknow, Kanpur, Agra, Allahabad, Varanasi and Meerut have prepared Comprehensive Mobility Plans and bus systems have been funded under the JNNURM scheme. The existing fleet is grossly inadequate in size and overaged. All the city transport corporations handling the intra city urban transportation are incurring heavy losses and are severely constrained to augment the capacity without government support.

- Metro Rail Transit System (MRTS):

To transform urban mobility in the state with rapid transit through metro rail, the government of UP plans to create a consolidated 'UP Metro Rail Corporation'. The state has operationalized construction of Lucknow Metro Rail. Detailed project reports are also being prepared to implement metro rail projects at Varanasi, Kanpur Nagar, Agra and Meerut. (Source: http://uptownplanning.gov.in/page/en/urbanization-in-uttar-pradesh)

Other modes of transportation

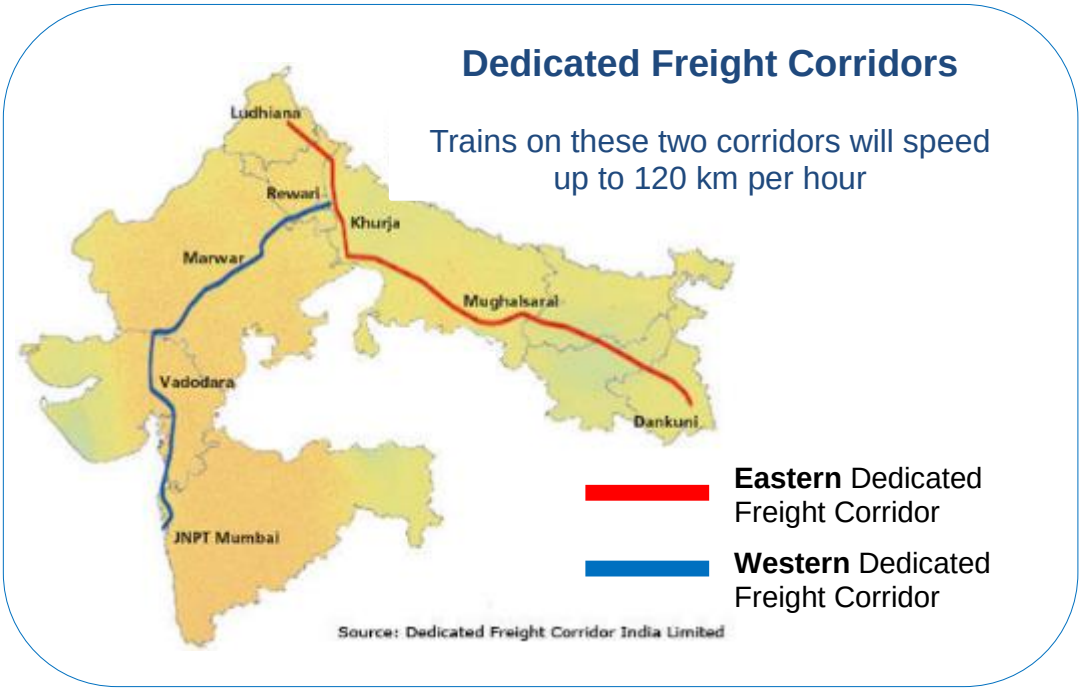
Due to inadequacy of public transportation, there has been increase in dependency on personalized modes of transportation giving way to private taxi services leading to unplanned mobility in the state. Further, there exists serious concerns in terms of quality of services and passenger safety in these vehicles. Technology based aggregators like Ola, Uber, etc. have started operations across various cities in the state.

Interstate and Intercity Bus Services

The current public transport system is dominated by buses of Uttar Pradesh State Road Transport Corporation (UPSRTC) for inter-city travel and by buses of urban transport authorities for intra-city travel. The public transportation systems in UP are supplemented by private buses on permits. The demand gaps are filled by taxis, mini buses and buses on contract carriage illegally operating as stage carriages.
With a fleet size of over 12194 buses which operate over 4.1 million kilometers catering to the travel needs of over 1.8 million people and earning over Rs.119.8 million every day. Furthermore, several technological interventions like use of ETMs, vehicle tracking, fuel automation, FASTTAG, the corporation has made profits consistently for the last four years.
With no financial support for fleet augmentation from the state, the corporation is adding about 10% additional buses in the current year. The corporation has actively engaged with private entrepreneurs, who contribute to about 20% of the fleet size on a profit sharing revenue model. The corporation has developed one bus station in public private partnership mode and is in the process of developing 21 more.

Dedicated Industrial & Freight Corridors:

Uttar Pradesh with its unique location advantage lies along the western and eastern dedicated freight corridor that ensures a strong industrial connectivity and mobility. The Delhi Mumbai Industrial Corridor and Amritsar Kolkata Industrial Corridor pass through Uttar Pradesh and intersect in the Gautam Buddha Nagar of the state. With 57% catchment area of Eastern Dedicated Freight Corridor and 8.5% catchment area of Western Dedicated Freight Corridor falling in Uttar Pradesh, the state government is developing green routes and logistics hubs providing uninterrupted freight movement.



Challenges and Issues

Planning, designing and implementing a mobility system is a complex task. Many stakeholders – local, state, central government, private industry and business from various sectors – need to collaborate. Mobility networks have a to and fro relationship with urban development in cities and states.

Within the mobility networks, a complex set of modes – private (2 and 4 wheelers), public (paratransit, buses and rails), shared (TNCs, bike shares) and heavy duty vehicles (trucks and tempos), and physical infrastructure such as roads and freeways, bus and train stations, air strips and airports, freight villages etc. – have to be pieced together to create a seamless and efficient system of movement of people and goods. Increasingly, in river rich states such as Uttar Pradesh, surface transport and water-based modes have to be planned in an integrated manner.

Energy consumed and fuel burned to drive vehicles also levies burdens on environmental resources such as air - increases greenhouse gas emissions which depletes the ecology and economic of the region in the long run. Further, rapid growth of private vehicle ownership in comparison to public transport infrastructure has imposed heavy costs on the air quality, increased the road congestion and increased the total number of fatal road accidents in the state. The main challenges are:

- Inadequate and inaccessible public transport. Poor connectivity in rural areas to towns, tehsils and key economic/urban centers of the state
- Underutilisation of waterways and railways for inter-state and intra-state use

- Energy related pollution impacts due to vehicle emissions – declining air quality, increased burden on public health
- Road transport is the third major contributor (7-12% to PM2.5 emissions) after residential, and industrial sources; Some of the most polluted cities of India are in UP which includes Kanpur, Lucknow, and Varanasi
- Highest number of road deaths in the country. Most road accidents in UP occur due to breach of speed limits (34%) and drunken driving (15%)
- High number of gender based crimes on women in transit
- Road congestion in urban areas
- Lack of a central body that governs passenger and freight mobility system - rail, road, water & other forms are managed by different agencies
- Financing public transport – especially in low density rural areas
- Fragmented urban development and lack of transit oriented development in major economic centres and areas where high residential growth is envisaged
- Lack of pedestrian pathways and bike lanes for promoting non-motorised transport
- Electric mobility:
    - Economic viability, high battery costs
    - Charging infrastructure cost and installation
    - Skill development for operating electric vehicles and charging infrastructure
    - Stability of power/electricity supply in the state
- Need for capacity development in transport and infrastructure agencies

Objective for Mobility

The following ten objectives articulate the broad mobility vision of the state. In totality, they cover multiple dimensions of mobility, to serve the rapidly growing population, rising urbanisation and ensuring eco-friendly transportation services in the state. The objectives intend to provide an efficient and competitive mobility throughout rural and urban clusters of the state. Each objective carries detailed action points which are combined in the form of a state action plan, given in section 6 of this report. The objectives are as follows:

Objective 1: To provide greater access to rural areas and connecting them to key economic centers and social services

Objective 2: To create an affordable, reliable and convenient urban public transit system to reduce single-occupancy vehicles and reducing road congestion

Objective 3: To ensure safe commuting for all using an education-enforcement-engineering-emergency services approach and mitigating in-transit crime against women

Objective 4: To promote R&D and technology upgradation through intelligent transport solutions and digitisation for efficient mobility, last mile connectivity and safety for commuters

Objective 5: To improve urban transportation by parking management and creating taxi aggregator hubs to decongest the roads

Objective 6: To encourage shared mobility and transit oriented development to decongest the urban traffic and ensure last mile connectivity

Objective 7: To plan and develop complete streets, which divide equitably road space between various public, private and non-motorized modes

Objective 8: To promote green mobility for improving air quality, reducing CO_2 emissions

Objective 9: To mobilise the connectivity advantage and enhance the infrastructure for various nodes including high quality air connectivity, inland waterways, etc.

Objective 10: To encourage new models of business and mobility financing to create entrepreneurship and employment opportunities in mobility sector

Key Strategies

Rural Mobility

- Connecting all 35000 unserved villages to the nearest urban centres
- Providing last mile connectivity from bus depots within 500m of walking distance
- Increasing paratransit, bike and pedestrian friendly pathways
- Increasing frequency, penetration, quality & safety of bus services in rural areas
- Creating rural multimodal systems with river ferries, road and railways
- Promoting private participation to overcome rural mobility challenge. Attracting private investments in augmentation of bus fleet size and development of bus ports

Provide efficient urban public transit

- Increasing frequency and high quality bus services
- Multimodal integration for first mile and last mile connectivity – with collaboration with taxi aggregators, paratransit services, ensuring safe and obstruction free pedestrians pathway and dedicated bike lanes
- Implementing Integrated Traffic Management System (ITMS)
- Promoting common mobility cards across all transit modes for commuter convenience
- Providing cost effective, clean and shared options for first and last mile connectivity
- Collaborating with taxi aggregators for providing competitive pricing range for commuters for completing their last mile journeys

Safety

Road safety:

- Decrease deaths due to road accidents by 50%
- Correcting road design and engineering to prevent road crashes
- Stricter enforcement of speed limits and abolishing drunken driving in UP
- Specialised safety compliance norms and enforcement for two wheelers and trucks

Women and children safety:

- Creating online/app based women help lines services, and installation of CCTV cameras, panic buttons in public transport vehicles
- Raising awareness in commuters on safety issues

R&D and Intelligent Transport Solutions

Intelligent Transport Systems (ITS) can be used for efficient planning and operations of public transit, digital payment methods and fare integration for last mile connectivity as well efficient mobility options. More specifically, this will include:

- Implementing common mobility cards for all modes of public transport and infrastructure such as parking for convenience of the consumer
- Developing command and control centre with CCTV monitoring and vehicle tracking systems

Parking and Congestion

- Improving usage of public transport (buses and metro rail) by making it efficient, comfortable and affordable for both rural and urban dwellers
- Parking demand management through efficient pricing
- Limiting parking spots per dwelling
- Implementing congestion charging in high emission and high traffic zones
- Regulating parking through charging and creation of dedicated hubs for taxi aggregators to manage congestion and fairly price the use of road space
- Developing hawkers zone and open markets to eliminate road side encroachment and shifting homeless people on the streets to night shelters

Shared mobility and Transit oriented development

On-demand options of mobility including bikes, cars, taxis and shuttles will help solve the “first mile last mile” access dilemma and create a seamless navigation for citizens. This will also assist in increasing the convenience for passengers and hence the uptake of public transport. The state will use a combination of the following options

- Car and bike sharing
- Public Bicycle Sharing (PBS)
- On-demand ride services in rural areas, where housing is sparsely located and is not accessible by public transit
- Create land use policies and planning for encouraging housing, mixed use and commercial development along the metro rail lines and key bus terminals

Non-motorised Transport /Pedestrian facilities

- Dedicated bus lanes, and dedicated cycle tracks
- Dedicated and high quality pedestrian footpaths
- Development of complete streets – with equitable allocation of road space to pedestrian and cycling infrastructure
- Development of public spaces for community cohesion
- Removal of encroachment of footpath and relocating the street hawkers, vendors etc.

Green Mobility

- Promoting electric rickshaws, e-autos and motorbikes for first and last mile connectivity
- Promoting electric buses in public transportation and identifying business models for accelerated adoption
- Promoting a comprehensive policy framework for faster adoption of green mobility technologies
- Collaborating with power and electricity sectors to set up electricity tariffs for creating a wide network of charging infrastructure
- Creating storage and distribution infrastructure for green fuel including CNG, ethanol, biofuel, etc.
- Strengthening the PUC centres with calibrated equipment, standardised software and real time data
- Upgradation of skills to cater to the needs of electric mobility

Multi Modal Integration

- Identifying and implementing a mobility system that uses road, rail, airway and inland waterways infrastructure as a combination and effectively uses the regional features such as rivers, topography and other resources of the region
- Developing DMIC and AKIC allied infrastructure
- Developing state of art expressways, highways and upgradation of existing highways for seamless connectivity across the state
- Promoting air connectivity under the Regional Connectivity Scheme and state’s aviation policy
- Developing passenger ferry system and freight hubs on NW-1
- Creating a multimodal freight systems – surface (road and railways), inland waterways and air based – that connects entrepreneurs in urban areas and farmers in rural areas
- Need for a unified body across sectors/modes
- Promoting development of housing and employment centers along existing and upcoming metro rail networks, or vice versa
- Ensuring all affordable housing is located within 300m of connection to public transport

Mobility Financing and Entrepreneurship

- Creating a program for fostering local entrepreneurship to generate mobility ideas that are original to the needs of various urban, semi –urban and rural cities in UP.

- Creating an Urban Transport Fund for solving mobility related gaps
- Creating a Viability Gap Funding for Public Transport
- Using Private-Public Partnership (PPP) in parking development
- Innovative financing mechanism by promoting non-fare revenue

State Action Plan

Intervention	Action areas
Rural mobility	• Connecting all unserved villages to nearest urban centres and increase the frequency and reliability of bus service • Increasing paratransit, bike and pedestrian friendly pathways • Creating rural multimodal systems with river ferries, road and railways • Attracting private investments in augmentation of bus fleet size and development of bus ports
Efficient urban public transit	• Increasing frequency and high quality bus services • Multimodal integration for first mile and last mile connectivity – with collaboration with taxi aggregators, paratransit services, ensuring safe and obstruction free pedestrians pathway and dedicated bike lanes • Implementing Integrated Traffic Management System (ITMS) • Collaborating with taxi aggregators for providing competitive pricing range for commuters for completing their last mile journeys
Safety	Road Safety: • Decrease deaths due to road accidents by 50% • Correcting road design and engineering to prevent road crashes • Stricter enforcement of speed limits and abolishing drunken driving in UP Women and Children Safety: • Creating online/App based women help lines services, and installation of CCTV cameras, panic buttons in public transport vehicles
R&D and Intelligent Transport Solutions	• Implementing common mobility cards for all modes of public transport and infrastructure such as parking for convenience of the consumer • Developing Command and Control Centre with CCTV monitoring and vehicle tracking systems
Decongesting	• Parking demand management through efficient pricing and Limiting parking spots per dwelling • Implementing congestion charging in high emission and high traffic zones • Regulating parking through charging and creation of dedicated hubs for taxi aggregators to manage congestion and fairly price the use of road space • Developing hawkers zone and open markets to eliminate road side encroachment and shifting homeless people on the streets to night shelters
Shared mobility and Transit oriented Development	• On-demand options of mobility - Car and bike sharing and Public Bicycle Sharing (PBS) • On-demand ride services in rural areas, where housing is sparsely located and is not accessible by public transit • Create land use policies and planning for encouraging housing, mixed use and commercial development along the metro rail lines and key bus terminals
Non motorised transport and Pedestrian facilities	• Dedicated bus lanes, cycle tracks and dedicated and high quality pedestrian footpaths • Development of public spaces for community cohesion
Green Mobility	• Promoting electric rickshaws, e-autos and motorbikes for first and last mile connectivity

	• Promoting electric buses in public transportation and identifying business models for accelerated adoption • Promoting a comprehensive policy framework for faster adoption of green mobility technologies • Collaborating with power and electricity sectors to set up electricity tariffs for creating a wide network of charging infrastructure • Creating storage & distribution infrastructure for green fuel including CNG, ethanol, biofuel, etc.
Network infrastructure	• Developing multi modal mobility for passenger as well as freight movement • Developing DMIC and AKIC allied infrastructure and expanding the State of art expressways, highways including upgradation of existing highways for seamless connectivity across the State • Promoting air connectivity under the Regional Connectivity Scheme and State's aviation policy • Developing passenger ferry system and freight hubs on NW-1 • Promoting development of housing and employment centers along existing and upcoming metro rail networks, or vice versa
Mobility financing	• Creation of an Urban Transport Fund for solving mobility related gaps • Creation of a Viability Gap Funding for Public Transport • Use of Private-Public Partnership (PPP) in parking development • Innovative financing mechanism by promoting non-fare revenue

Policy and regulatory reforms

Creating a multimodal and seamless mobility system requires support and collaboration of many different regulatory bodies. To achieve its mobility vision, the government already has formulated many new policy frameworks recently such as -

Existing Policy and regulatory actions –

- **Logistics Policy 2018** – UP is one of the pioneering state to provide an exclusive private logistics park policy. The State's logistics policy provides to develop 'free trade zones' along the airports and railway terminals with good rail and road connectivity for quick freight movement. Similarly, it provides for 'green channels' for Exim cargo with comprehensive transport zones and terminals.
- **Development of 21 multimodal bus terminals** under Public-Private Partnership (PPP) model: These bus terminals offer an opportunity for the state to experiment innovative solutions to last mile connectivity with high ridership potential and soliciting partnership from private sector.
- **State's Civil Aviation Promotion Policy 2017 and Regional Connectivity Scheme (RCS):** To provide air connectivity to the growing air traffic in Uttar Pradesh and create economic growth by connecting various cities of the state and also create interstate connectivity.

Upcoming Policy and regulatory reforms -

- **State's Electric Vehicle Policy 2018** – To enable Uttar Pradesh as the preferred destination for investing into EV manufacturing, employment generation through manufacturing of electric vehicles in the state and creating energy storage capacity. The state's proposed policy also aims at promoting green mobility technologies such as biofuel based, hydrogen based or solar based EVs. Towards this, the State will mobilise the existing UP Solar Energy policy 2017 and UP Bio fuel Policy 2017.

- **Taxi aggregator policy** – To structure a set of incentives and regulations to integrate services of fleet aggregators such as Ola, Uber to fill in the gaps in the mobility system and complement the existing public and private mobility needs of the cities and towns.
- **Bike taxi policy –** Similarly, state will come up with a bike taxi policy to promote 2-wheeler shared mobility which will help in decongesting the urban traffic.
- **Creating a consolidated agency for transportation –** Through the proposed 'Unified metropolitan transport authority bill' the state aims at creating the required consolidated agency. The proposed authority will regulate the development, operation, maintenance, monitoring, supervision & provision of urban transport within urban mobility areas. The authority will cover all existing urban transport agencies in the state.
- **Urban Transport Fund –** Under the same proposed bill for unified metropolitan transport authority, the State will create an Urban Transport Fund to solve the mobility gaps and will promote R&D and technology transfer.

Conclusion

In the context rising urban population, three fourth of population still residing in rural hamlets, socio-economic development needs, Uttar Pradesh looks forward to advancing this mobility vision and strategy. Uttar Pradesh aims to a multimodal, seamless, efficient and integrated mobility systems that is economically viable for operators, affordable, reliable and safe for users and pursuant of a low carbon path. This report highlights several of these challenges and also areas of opportunities for the state, existing capacity, policy framework and other initiatives in the transport sector of the state. Finally, the report elucidates key objectives and action plan for the state to convert its vision into a reality by 2030.

Summary of action points as part of Uttar Pradesh's vision and strategy:

- Improving usage of public transport (buses and metro rail) by making it efficient, comfortable and affordable in all Municipal Towns
- Rural mobility options (motorised: buses, paratransit, and non-motorised: pedestrian and bike paths through complete street planning)
- Safety and security of vulnerable commuter groups – women, children, elderly and disabled
- First and last mile connectivity for increasing the uptake of public transport
- Given the capital intensive and technical nature of transportation infrastructure, using the construction and operation of metro rail projects, railway manufacturing and electric vehicle and charging infrastructure
- Promoting evidence based measures for controlling air pollution and greenhouse gas emissions from road transport
- Starting with electric public buses on PPP mode and developing charging infrastructure on agreement mode
- Use of viability gap funding and setting up of an urban transport fund
- In coordination with department of housing and urban planning, developing housing and commercial and mixed use buildings along transit lines
- Promote inland waterways for both passenger and freight movement

References

- Census of India, 2011
- Basic Road Statistics, Ministry of Road, Transport and Highways, Government of India (2015-16)
- Railway statistics and details, Ministry of Railways, Government of India
- Aviation Statistics and details, Ministry of Civil Aviation, Government of India
- UPSRTC Statistics, 2017-18
- NITI-RMI Report, 2017
- Safe Access Mass Transit Manual, 2015
- Enabling the Transition to Electric Mobility of India, 2017
- Valuing Society First Feebates Policy, 2015

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सत्यमेव जयते
NITI Aayog


MOVE
GLOBAL MOBILITY SUMMIT
SEPTEMBER 7 & 8, 2018