

April 2018

Term of Reference for Preparation of Comprehensive Mobility Plan (CMP)



सत्यमेव जयते

**Ministry of Housing & Urban Affairs
Government of India**

CONTENTS

CONTENTS.....	1
LIST OF FIGURES	1
1. TERM OF REFERENCE	2
1.1. COMPREHENSIVE MOBILITY PLAN	2
1.2. METHODOLOGY FOR PREPARATION OF CMP	2
1.2.1. Stage I: Define objectives of Mobility Plan and delineate Planning Area and Horizon of Mobility Plan.....	2
1.2.2. Stage II: Data Collection and Analysis of the existing Urban Transport Environment	2
1.2.3. Stage III: Development of Business as Usual (BAU) Scenario.....	4
1.2.4. Stage IV: Development of Sustainable Urban Transport Scenarios.....	5
1.2.5. Stage V: Development of Urban Mobility Plan	5
1.2.6. Stage VI : Implementation Plan	7
2. ANNEXURES.....	11
2.1. ANNEXURE I: TABLE OF CONTENTS FOR COMPREHENSIVE MOBILITY PLANS.....	11

LIST OF FIGURES

Figure 1: Methodology flow chart for preparation of CMP	9
---	---

1. TERM OF REFERENCE

1.1. COMPREHENSIVE MOBILITY PLAN

A Comprehensive Mobility Plan (CMP) is a long-term vision for movement of people and goods for a city and provides a strategy and investment program to meet the vision. The methodology for the preparation of a CMP is given below:

1.2. METHODOLOGY FOR PREPARATION OF CMP

1.2.1. Stage I: Define objectives of Mobility Plan and delineate Planning Area and Horizon of Mobility Plan

Task 1: Define Objectives and Vision of the Mobility Plan

- Define Objectives and Vision of the Mobility Plan. These objectives would aim at addressing the following aspects:
 - Develop a long-term strategy for the desirable city mobility pattern that recognizes all modes of transport and avoids a piecemeal and reactive approach to existing problems and those expected to arise in future.
 - Improve and promote public transport, non-motorized vehicles (NMVs) and facilities for pedestrians as important transportation modes.
 - Promote integrated land use and transport planning.
 - Develop an urban transport strategy that is in line with the current National Urban Transport Policy (NUTP).
 - Ensure that the most appropriate, sustainable and cost-effective investments are made in the transport sector.

Task 2: Delineation of the Planning area and planning horizon

- Delineation of planning boundary for Mobility Plan based on existing Planning and Municipal area boundary and in discussions with relevant agencies. The CMP should be made for a horizon period of 30 years and should to be reviewed after every 5 years and revised, if required.

1.2.2. Stage II: Data Collection and Analysis of the existing Urban Transport Environment

Task 3: Review of City profile, delineation of Traffic Analysis Zones and review of Land Use pattern and Population density

- Data on existing land use and land use plans should be collected and presented after a detailed review of existing development plans, including the Master Plan and/or the City Development Plan (CDP). In particular, new development areas that will affect transport demand in the planning area should be highlighted.
- The secondary data collected should be utilized in studying the past and existing growth pattern, land use plan of the city and its suburbs. The data to be used in projecting future growth patterns, land use patterns and possible growth directions.
- In case, there are data gaps or the survey data is more than 2 years old, fresh primary surveys to be conducted, if considered necessary.

Task 4: Review of the Existing Transport Systems

A review of existing transport infrastructure and facilities should be done for each transport mode, including walking, bicycle, cycle rickshaw, shared auto-rickshaw, public transport and any other prevailing modes. The review will include all types of facilities and amenities including pavement description, intersection treatments, lighting, parking space, parking cost and operation-related parameters.

Task 5: Data Collection Approach - Methodology and Sources

- Relevant data should be collected from secondary sources like published reports (CDP, CMP or CTTS), city authorities or primary surveys.
- The primary surveys to be carried out for the analysis of the existing urban transport systems are as follows:
 - Road Network Inventory Surveys (within city limits- All major arterials and important sub-arterials and local streets)
 - Classified Traffic Volume Count Surveys - 16 hours (Outer and Inner Cordon)
 - Speed and Delay Surveys – Peak hour and off peak hour
 - Pedestrian Count Surveys - 8 hours (peak hours)
 - Parking Surveys - 12 hours (peak hours)
 - Public Transport - Boarding and Alighting Survey (based on city travel characteristics)
 - NMT Opinion Surveys
 - Junction Turning Volume Counts - 12 hours

Task 6: Study of Existing Travel Behavior

Two important considerations that should be taken into account while collecting data on travel patterns are; the collected data should be representative and cover the travel behavior of all individuals within a household; and the data to be segregated by social group and trip purpose. The household surveys should be designed to assess different social groups effectively and to represent people's perceptions towards different modes of transport in terms of time, cost, comfort, safety and security. For understanding and analyzing the existing travel behavior and characteristics, the following additional primary surveys need to be conducted:

- Screen Line Classified Volume Count Surveys - 16 hours
- Household Interview Surveys (sample size should be between 1-2% depending on the size of the city)
- Road Side Interview Surveys - 8 hours (peak hours)

Task 7: Review of Energy and Environment

Quantifying energy consumption for transport is important for estimating the CO₂ and local air pollution emissions from transport-related activities. In order to create a complete picture, both top down and bottom-up approaches for estimating energy consumptions will be adopted.

Task 8: Analysis and Indicators

The impact of the projects in terms of service level benchmarks should be evaluated. Service level performance benchmarks identified as per the Ministry of Housing and Urban Affairs (MoHUA) guidelines are for the following areas of intervention:

- 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
- Pollution levels
- Integrated land use transport system
- Financial sustainability of public transport

As part of the study, the impact of the projects proposed should be evaluated in terms of improvement in the Service Level Benchmark (SLB) of each indicator and overall improvement in SLB.

1.2.3. Stage III: Development of Business as Usual (BAU) Scenario

Task 9: Framework for Scenarios

BAU Scenario represents the future based on the continuation of past trends, and is used as a counterfactual reference or benchmark for assessing policy interventions. In terms of passenger transport, the BAU scenario predicts the increased car ownership and a higher demand for motorization. In terms of technologies, the scenario foresees continued reliance on fossil fuel cars, with improved efficiency and a greater share of electric and hybrid cars.

Task 10: Socio-economic Projections

City's future economic transitions depends on the current economic transitions taking place across the country. Demographic projections, Employment projections and Industrial growth projections will be done using the model and other parameters.

Task 11: Land Use Transitions

The land use type should be disaggregated into residential, commercial, retail, recreational, industrial, educational, religious, and other categories. Land use projections and allocations for the horizon years should be done in three steps. The first step includes the projection of socio demographics and the per capita space requirements for each activity in the city. The second step involves the allotment of activities based on connectivity and distances, as well as the availability of space. The third step includes the scope of the land use transition.

Task 12: Transport Demand Analysis

Demand for passenger transport should be estimated using a four-step model. The four-step model is based on an understanding of existing travel behavior obtained from the household survey, and provisioning existing transport infrastructure and service quality. The transport model to be developed must be a peak-hour model and not a daily model. After set up for the base year, the transport traffic flows on different road links should be compared with the actual traffic volume counts observed at various locations observed across the city.

Task 13: Technology Transitions

An understanding of vehicles, fuels and CO₂ emissions from electricity use in transportation system is essential to understanding the implications of travel demand on CO₂ emissions and air quality.

Task 14: Model Framework

The framework for sustainable urban mobility should utilize the four strategic levers: Urban form, Non-Motorized Transport (NMT), Public Transport and Technology. The framework should study the impacts of alternative strategies using key indicators for mobility, safety, and local environment, as well as more aggregate indicators like CO₂ and energy use.

1.2.4. Stage IV: Development of Sustainable Urban Transport Scenarios

Task 15: Framework for Scenarios

Review of Green House Gas Emission indicators for the BAU scenario as well as sustainable scenarios should be done, however, technological transitions for various scenarios should also be discussed in detail.

Task 16: Strategies for Sustainable Urban Transport Scenario

Various scenarios should be developed describing the plans and policies aimed at limiting private vehicle ownership and use. The scenarios also assume an increase in motorized transport to some extent, which is inevitable given the low level of vehicle use on a per capita basis. Therefore, emphasis should be placed on improving technology in terms of efficiency and emissions.

Task 17: Transport Demand Analysis of Alternative Strategies for Sustainable Urban Transport

Strategies on Urban Structure, Non-Motorized Transport infrastructure, Public Transport, Improving Public Transport, NMT and Urban structure, Technology options, Regulatory and financial measures should aim to improve transport infrastructure and increase the cost of using personal motorized vehicles. The transport model to be developed must be a peak-hour model and not a daily model.

Task 18: Technology Transitions under a Low Carbon Scenario

In the low carbon scenario, the fuel mix is expected to diversify further from BAU scenario towards bio-fuels, electricity and natural gas. With advanced technologies, vehicle efficiency will also improve, and thus the overall demand for fuels will be lower in the low carbon scenario.

Task 19: CO₂ Emissions and Air Quality

The model framework is same as the BAU scenario for estimating CO₂ Emissions and Air Quality. The indicators for the sustainable urban transport scenario are similar to those estimated for the base year.

1.2.5. Stage V: Development of Urban Mobility Plan

Task 20: Integrated Land Use and Urban Mobility Plan

Integrating land use with the urban mobility plan would entail a two-way interaction between the two plans. High density residential areas intertwined with high-density employment areas, along with increased travel costs and an efficient public transport system would encourage

people to use NMT for shorter trips and public transport for longer ones, thus encouraging low-carbon mobility. To summarize, the land use plan should locate activities in a manner that encourages low-carbon mobility and the urban mobility plan, in turn, should facilitate access to activities.

Task 21: Formulation of Public Transport Improvement Plan

CMP details the Public Transport Improvement Plans into a number of sections, including service improvements for buses, trams and para-transit, appropriate MRT options and development plans, trunk and feeder network systems and intermodal facility plans. Formulating a public transport improvement plan in small sized Indian city can involve several challenges. These range from assessing transport demand to service provision and its alignment with land use.

Task 22: Preparation of Road Network Development Plan and NMT Facility Improvement Plan

A set of specific projects and policy measures would need be identified that the city authorities need to implement as part of the Mobility Plan. These projects and policy measures could be categorized as follows:

- Road network development Plan
- NMT facilities

Task 23: Preparation of Mobility Management Measures

In CMP, traffic management plans cover parking plans, traffic control measures, intermodal facilities, demand management measures, traffic safety plan and ITS. Mobility management measures suggested in the CMP should enable use of public transit and NMT modes. Additional measures should be added to increase the cost and discourage the use of motorized travel, including the taxation of cars and fuel, land use planning that encourages shorter travel distances and traffic management by reallocating space on the roads.

Task 24: Preparation of Regulatory and Institutional Measures

Effective development of urban land use and transport systems often requires regulatory and institutional changes. Such requirements should be worked out in detail and documented in the CMP. These measures can be developed region-wide/ city wide or be project specific. The regulatory and institutional plan should include the following:

Regulatory measures in relation to:

- Bus service improvement (concession, privatization, and lease contract);
- Traffic safety improvement (traffic regulation, mandatory road user education, enforcement systems);
- Introduction of Transport Demand Management (TDM) measures;
- Vehicle emissions (focus on non-fuel based vehicles and compressed natural gas/CNG vehicles);
- Public-Private Partnerships (PPPs).

Institutional measures in relation to:

- Coordination mechanism to integrate public transport operation and to integrate fares;

- Establishment of Unified Metropolitan Transport Authorities (UMTA); if not in place earlier
- Establishment of SPVs for the implementation of proposed projects; and other changes necessary to promote PPPs.

Task 25: Development of Fiscal Measures

Fiscal measures should be considered to achieve a balanced modal split, and to secure the budget necessary to implement urban transport projects. As fiscal measures usually correspond to institutional and regulatory measures, the following aspects may have to be examined in the CMP document:

- Fare policy for public transportation, and parking;
- Subsidy policy for public transport operators;
- Taxation on private vehicles and public transport vehicles; and
- Potential for road congestion charging.

Task 26: Mobility Improvement Measures and NUTP Objectives

The land use and transport measures proposed in the CMP should improve mobility in the metropolitan area and cover the critical issues addressed in the NUTP. A table can be prepared summarizing the relationship between the NUTP objectives and the measures proposed in the CMP, together with a classification of the measures according to their implementation time frame (short, medium and long term).

1.2.6. Stage VI : Implementation Plan

Task 27: Preparation of Implementation Programs

The necessary interventions for public transport improvement plans, road development plans, NMT facility improvement plans and mobility management measures are listed next into a set of actionable projects to be implemented in the city and prioritized into the following categories

- Short term (next 2-5 years)
- Medium term (5-10 years)
- Long term (more than 10 years)

All the projects should be presented to the city stakeholders and the suggested implementing agencies identified for each project.

Task 28: Identification and Prioritization of Projects

- Short-term measures are aimed at improving the safety and accessibility of pedestrians, cyclists and public transport users through area level traffic circulation plans and measures like implementing traffic signals.
- Medium-term measures typically involve corridor-level projects like implementing cycle tracks and mass-transit corridors, city level initiatives like public transport fleet improvement and efficient scheduling, developing area level cycle networks and Public Bicycle Sharing (PBS) schemes, parking policy development and implementation in the city. They are primarily aimed at restricting the decrease in the city's public transport and non-motorized transport mode shares.

- Long-term measures include implementing the overall vision of the CMP. These project ideas are presented to the stakeholders in order to get their feedback on both the projects and their prioritization. The final list of identified projects should include the implementation framework, cost estimates and the likely funding options.

Task 29: Funding of Projects

The various project-funding options would be assessed, identifying the projects amenable to PPP and those that can be implemented based on the government sources of funding from the city, State Government and Central Government schemes. Alternative and innovative sources of funding should be identified to reduce the investment by various Government agencies.

Task 30: Monitoring of CMP Implementation

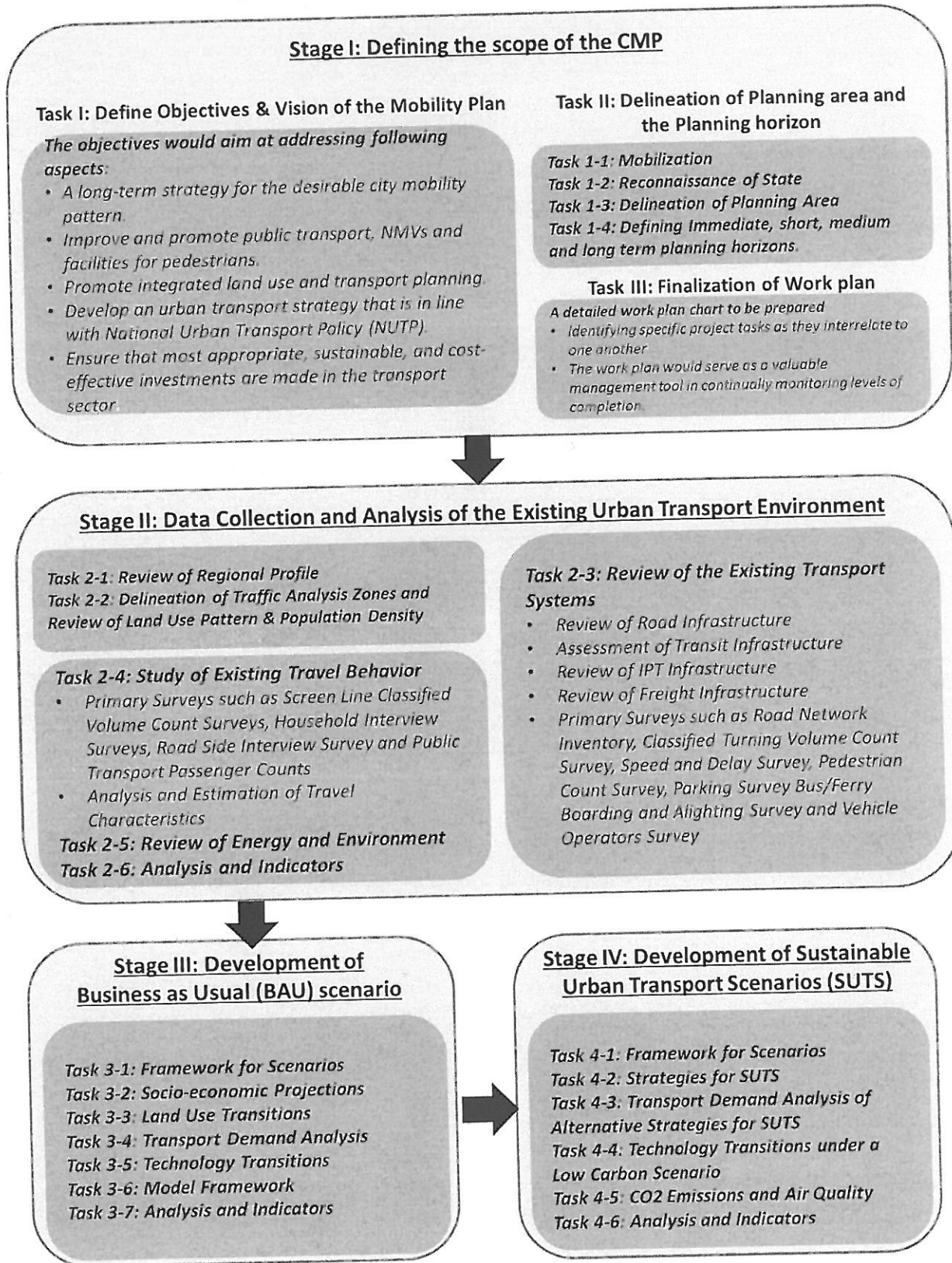
CMP is the basis for approving projects, plans and various regulatory measures within the city related to transport and it is therefore important to monitor and measure the impact of interventions. Agencies responsible for implementation of the projects and monitoring the progress of implementation of urban transport projects should be identified.

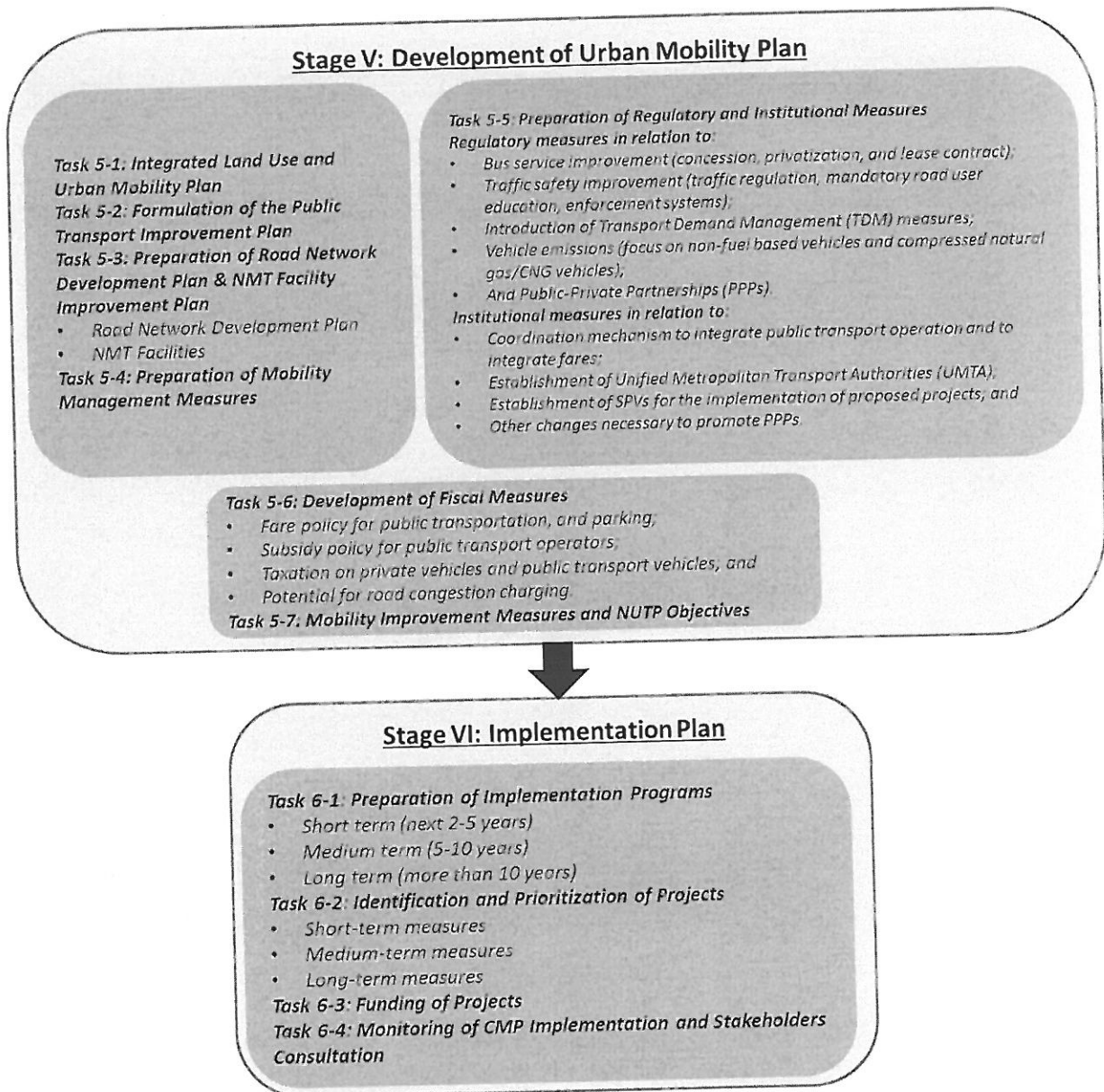
Task 31: Stakeholders Consultation

Stakeholders' consultation should be done after each major stage of the CMP such as the draft stage to ascertain their feedback and comments on the proposals and projects for improving urban transport.

The methodology flow chart for preparation of CMP is given in 1:

Figure 1: Methodology flow chart for preparation of CMP





The Table of Contents for preparation of CMP is given in the **Annexure I**.

2. ANNEXURES

2.1. ANNEXURE I: TABLE OF CONTENTS FOR COMPREHENSIVE MOBILITY PLANS

The following are the Table of Contents for Comprehensive Mobility Plan:

S.No Chapters

Executive Summary

1. Introduction

- 1.1. Define sustainable mobility principles
- 1.2. Impact of regional/national framework
- 1.3. National Urban Transport Policy
- 1.4. Delineation of Planning Area
- 1.5. Define objectives and vision of Mobility Plan
- 1.6. Review availability of resources
- 1.7. Stakeholder's identification
- 1.8. Approach and Methodology

2. Review of City Profile

- 2.1. Review of existing Transport system
- 2.2. Transport demand surveys
- 2.3. Review of existing land use pattern
- 2.4. Analysis of existing Traffic/Transport conditions
- 2.5. Traffic volume count
- 2.6. Road network Inventory
- 2.7. Modal share
- 2.8. Speed and delays surveys
- 2.9. Parking surveys
- 2.10. Non-motorized transport surveys
- 2.11. Future land use developments plan
- 2.12. Review of Energy and Environment
- 2.13. Analysis and Indicators

3. Transport Demand Assessment

- 3.1. Development of Business as Usual (BAU) scenario
- 3.2. Development of Sustainable Urban Transport Scenario
 - Framework for scenarios
 - Strategies and plans for Sustainable Urban Transport
 - Transport Demand analysis of Alternative strategies for Sustainable Urban Transport
 - Technology transitions under a Low carbon scenario
 - CO₂ emissions and Air quality
 - Analysis and Indicators (Comparison with benchmarks)
- 3.3. Conclusions

4. Development of Comprehensive Mobility Plan

- 4.1. Integrated land use and Urban mobility plan
- 4.2. Formulation of Public Transport Improvement plan
- 4.3. Preparation of Road Network Development Plan
- 4.4. Preparation of NMT (Non-Motorised Transport) Facility Improvement Plan
- 4.5. "Inter-modality" -Integrated development of all modes including non-motorised transport
- 4.6. Freight Movement Plan
- 4.7. Plans for Intelligent Transport System
- 4.8. Traffic management measures
- 4.9. Action plan and budget plan
- 4.10. Monitoring and evaluation plan
- 4.11. Inform and engage stakeholders including citizens
- 4.12. Development of Fiscal measures
- 4.13. Mobility improvement measures and NUTP Objectives
- 4.14. Impact of the proposed measures on Service Level Benchmark

5. Implementation Plan

- 5.1 Preparation of implementation programs
- 5.2 Prioritization of sub-projects
- 5.3 Funding of projects
- 5.4 Monitoring of CMP
- 5.5 Stakeholders Consultation