Framework for Inclusion of Urban Transport Sector Under Climate Action Plan For Indian Cities

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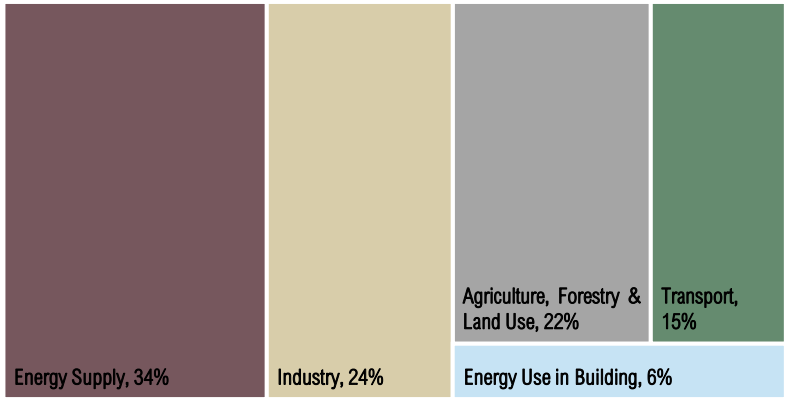
Contents

Need of the Study

Global Green House Gas Emissions, 2022

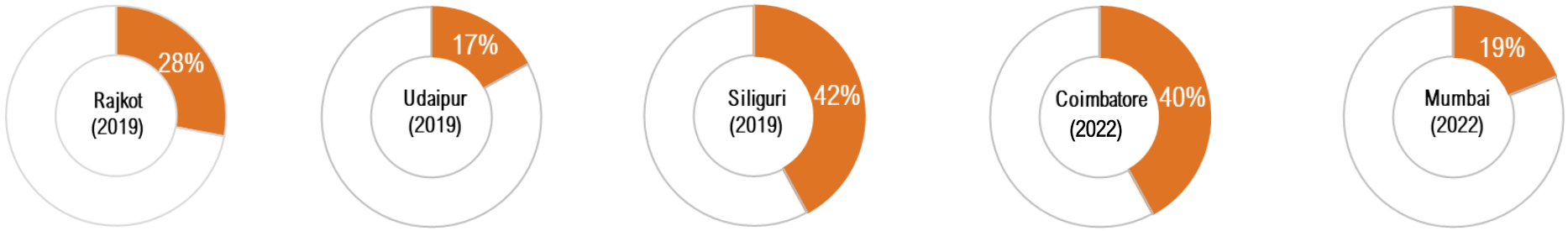


Source: IPCC, 2022

Without immediate action, its share could reach ***40% by 2030*** (ITF, 2021)

Transport emissions are responsible for **15% of GHG emissions** in the world

GHG Emissions from transport sector in Indian Cities



Source: City Climate Action Plans

Transport sector is among the top contributors of GHG emissions in Indian cities

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What is a Climate Action Plan (CAP)?

"A Climate Action Plan builds on the information gathered from **baseline GHG emission** inventories and **urban climate vulnerability assessments** to **identify priority actions** that would help the city adapt to climate change impacts, while significantly reducing GHG emissions from city activities. This plan also includes implementation and monitoring mechanism, along with the funding plans."

- MoEFCC

Energy & Buildings

Urban Flooding & Water Resource Management

Sustainable Transport

Air Quality

Urban Greening & Biodiversity

Waste Management

The focus of CAP in on reduction of GHG emissions and vulnerability

Aim

To understand and identify gaps in the current approach of integration of urban transport sector in Climate Action Plans

Objectives

1. Understand policy & the institutional mechanism for climate action plans, typical strategies/actions proposed for transport sector and identify gaps in the existing frameworks for developing CAPs;

2. Understand the existing approach of Indian cities to include transportation sector in urban climate efforts at city level;

3. Develop an assessment framework to evaluate the integration of urban transport sector in CAPs

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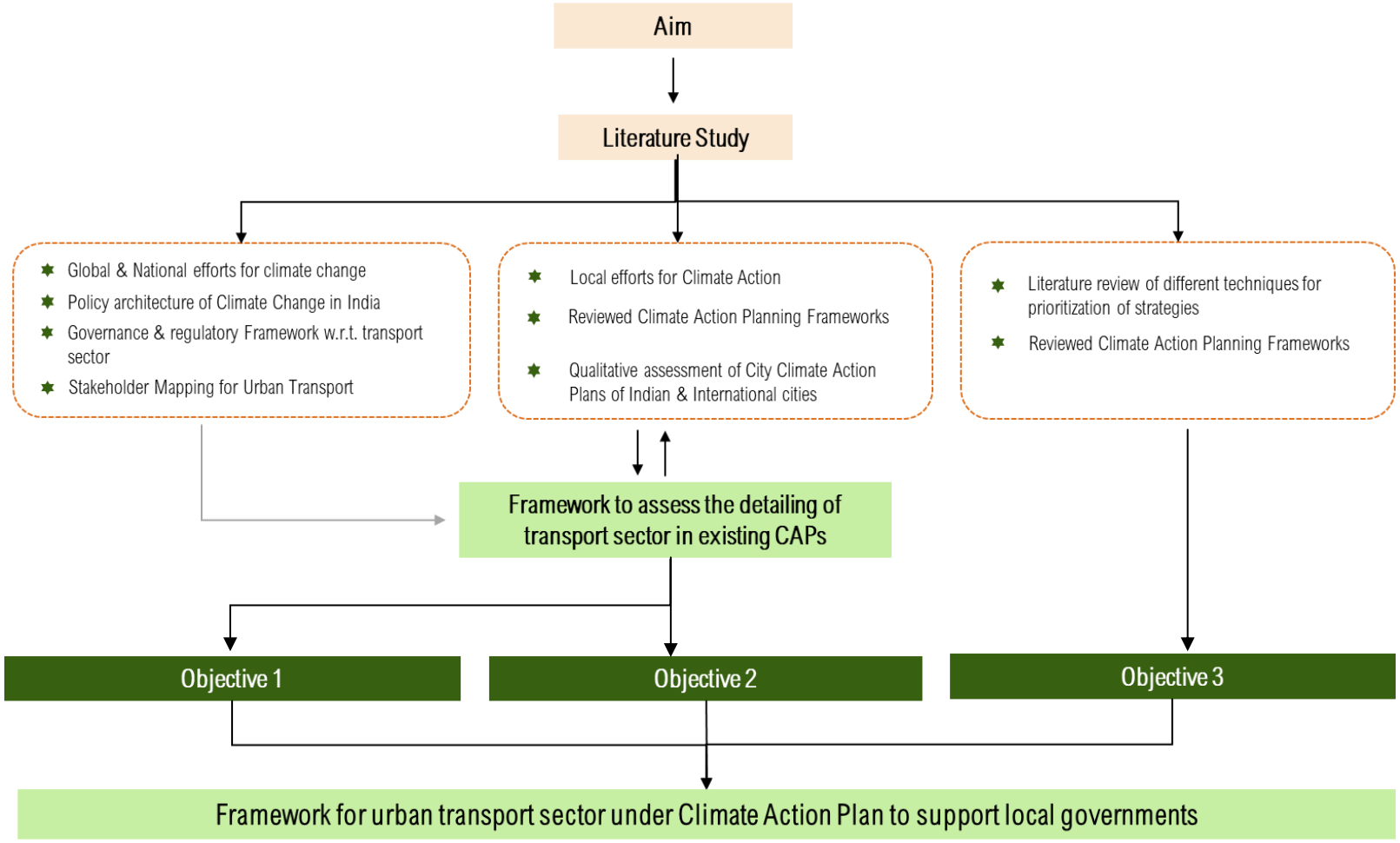
Research Methodology



Tasks

Objectives

Outputs

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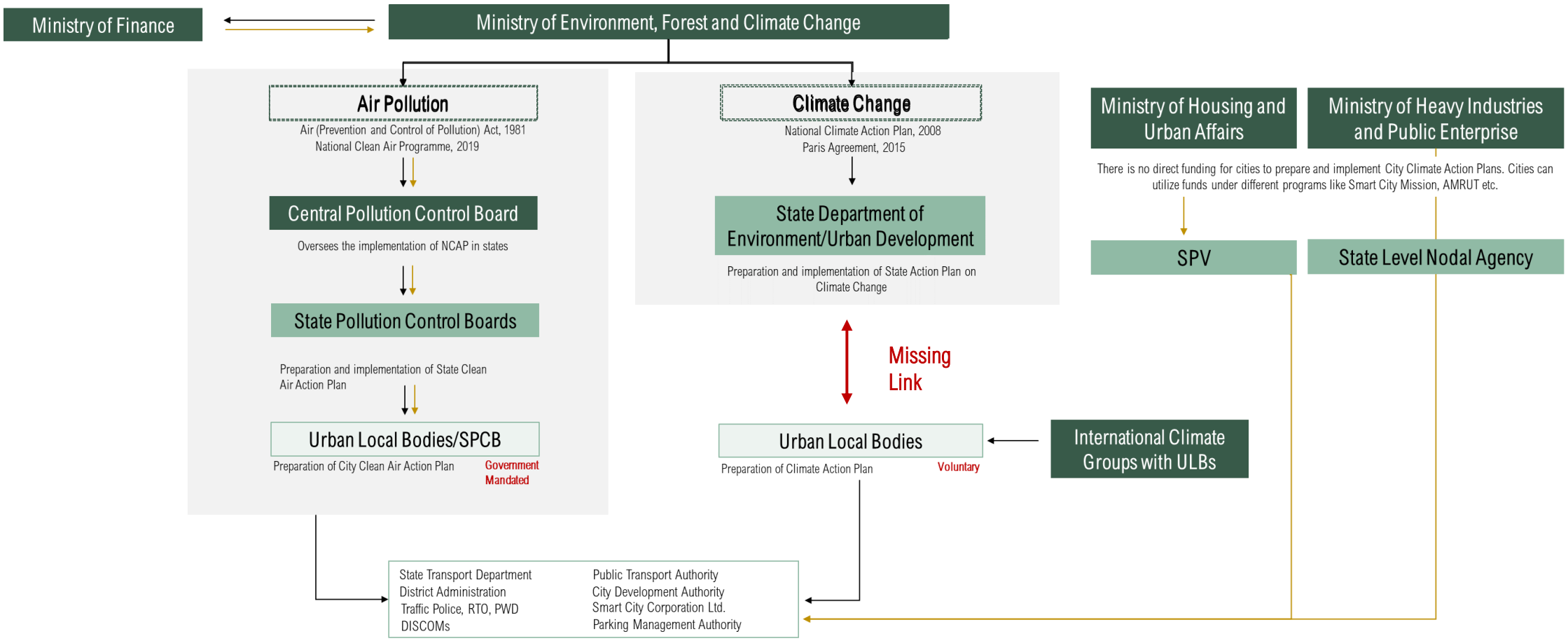
Literature Review

- Policy & Institutional Framework for Climate Action in India
- Assessment of existing climate action plans

Literature Review

Policy Framework for Climate Change in India

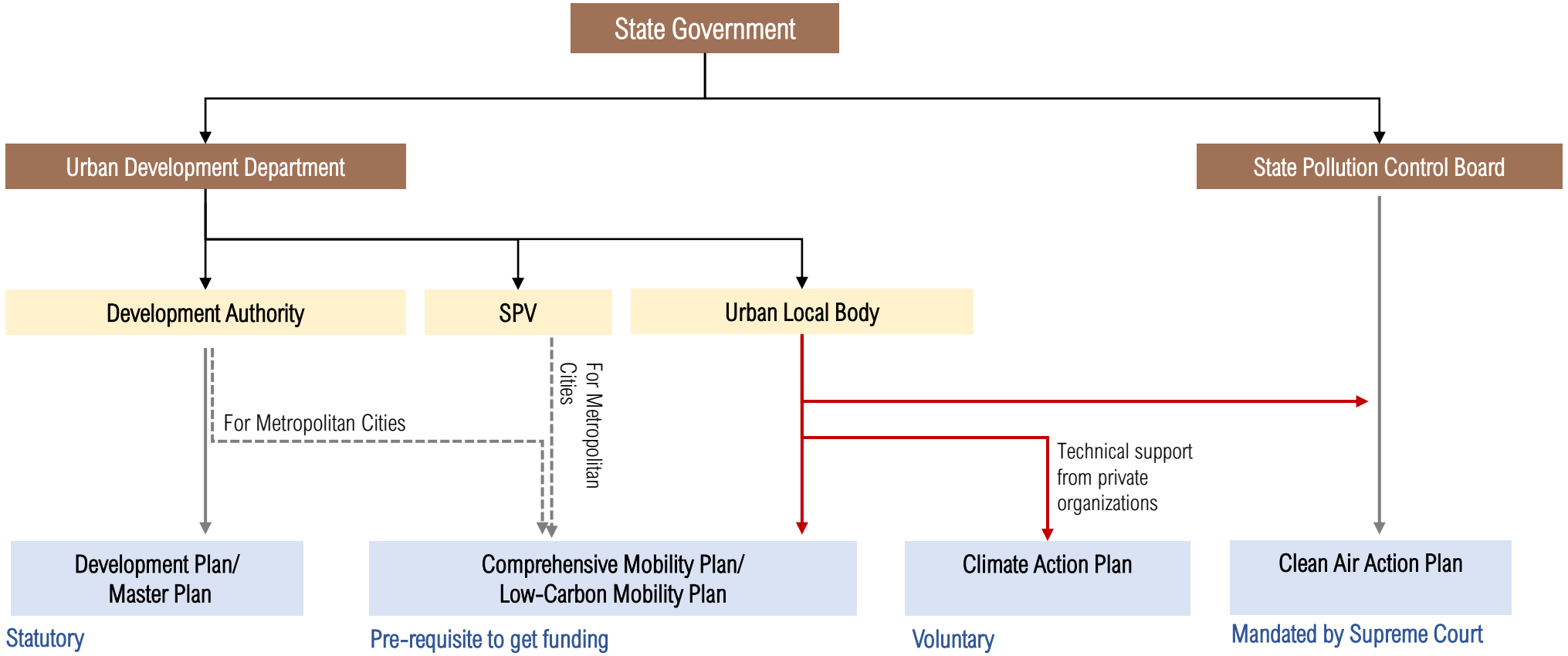


Cities are largely neglected in national framework to tackle climate change

Centre Government | State Government | Local Government | Functional Hierarchy | Flow of Funds

Literature Review

Type of plans a city have to prepare & implement in cities



State Government

Responsible Entity for Plan Preparation

Plans prepared by a city

Literature Review

Comparison of Plans prepared at city-level for Mumbai

	Development Plan for Greater Mumbai, 2014	Comprehensive Mobility Plan for Greater Mumbai, 2016	Action Plan for Control of Air Pollution in Mumbai, 2019	Climate Action Plan for Mumbai, 2022
Study Area	Mumbai Metropolitan Region	Mumbai Metropolitan Region	Mumbai Metropolitan Region	Mumbai Metropolitan Region
Plan Preparation	MMRDA (2014)	Municipal Corporation (2016)	Maharashtra Pollution Control Board (2019)	Municipal Corporation (2022)
Horizon Year	2034	2034	2030	2030
Target		80% modal share of sustainable transport by 2034	Reduction of PM levels by 40% by 20	73% modal share of sustainable transport by 2030
Details	DP has a chapter on the road network for regional and urban connectivity. Not much attention has been given to the climate in the DP. A separate chapter of Environment is incorporated in terms of climate, which focuses on green cover.	Policy level recommendations: To reduce the pollution from transportation sector. CMP has recommended promoting **car-pooling, parking management, congestion pricing, restriction on new private vehicle registration** and **advancement of vehicle technologies**	**Recommendations** • Regular check of PUC • Promoting NMT & Public Transport • Parking • Public Awareness • Fuel type- BS-VI, fuel adulteration • Road Widening, construction of highways • E mobility & alternate fuel vehicles • Traffic Demand Management • Restriction on freight movement during the day	**Recommendations** • Multimodal Integration, Parking • Public Transport: Bus priority, first- & last-mile connectivity • Grievance redressal for PT • Promote NMT: universal accessible infrastructure • TDM measures: policy measures for reducing vehicular ownership, • E-mobility, Charging Infrastructure, battery recycling • Urban freight-Electrification • Traffic signals • Institutional development: NMT cell. EV Cell,

Though the actions proposed in both plans and implementing agencies are similar, there are still different governance and funding structure for both creating multiplicity of plans.

Literature Review- From the perspective of Climate Change & Urban Transport

City Development Plan

- The concept of integration of climate change is limited to green cover in development plans of Indian cities
- Limited focus on implementation and monitoring of development plans

Comprehensive Mobility Plan/ Low-Carbon Mobility Plan

- Primarily focus on implementing mitigation measures. Adaption measures are not considered in CMP
- Limited to reporting of GHG emissions, without setting specific goals or targets to reduce the impact of transportation on climate change through GHG emission reduction

Clean Air Action Plan

- City-level action plans prepared by cities don't have any specific goals and targets
- Due to absence of legal mandate, there is a lack of accountability for the implementation
- There is limited understanding of sources of pollution and their contribution in the city CAAPs (only 25 out of 102 CAAPs include a source of emissions). And if the information is available, it is not used to identify and prioritize focus areas, which has led to the repetition of the same actions with similar timelines in multiple cities;

How detailed are Climate Action Plans?

Comparison of Plans prepared at city-level

	Rajkot (2018)	Udaipur (2019)	Siliguri (2019)	Coimbatore (2022)	Thane (2022)	Mumbai (2022)
Sub-sectors of Transportation	• Electric Mobility- Buses, Bike of field officers; • NMT • Public Transport • TDM	• Electric Mobility- Buses, IPT, Government cars, Garbage vehicles	• Electric Mobility- Buses • TDM	• Electric Mobility- Buses • NMT	• Electric Mobility- Buses, Cars, 2-w • Public Transport	• Public Transport • NMT • Electric Mobility • Urban Freight • Data Strategy • Parking • TDM • Capacity Development of drivers of buses
Level of proposed recommendations (Strategy/ Action)	Mix of both Strategy-level & actions Examples • Replacement of all 11 BRTS diesel buses with electric buses; • Rooftop SPV for renewable energy for electric buses	Strategy-level Examples: • Rooftop SPV for renewable energy for electric buses & IPT; • Electric buses in place of diesel buses	Strategy-level Examples: • Rooftop SPV for renewable energy for electric buses & IPT; • Replacement of 11 BRTS diesel buses in to electric buses	Strategy-level Examples: • Deployment of electric buses; • Implementation of PBS	Specific Action Examples: • 135 diesel taxis and buses in private offices to be replaced by CNG vehicles; • 400 diesel taxis to be replaced by EVs	Strategies Examples: • Create dedicated bus lanes where feasible; • Improve pedestrian infrastructure
Key Performance Indicators & Monitoring Mechanism	NA	NA	NA	NA	Yes	Yes
Institutional Mechanism	NA	NA	NA	NA	Identification of entities involved in implementation	Identification of lead entities involved in implementation

In Tier-2 cities, only those actions are proposed which are either implemented already or can get a fund under the state/national scheme

These are not implementable plan and not supported by an implementation plan to support cities to implement the proposed strategies

Comparison of National & International CAPs

		Urban Transport Sub-sectors included in CAP									
	Sources of Transport emissions mentioned	Public Transport Sector & IPT	NMT sector	Motorisation sector	Low-emissions vehicles	Urban Freight	Road Infrastructure	KPIs clearly defined	Actions are clearly defined	Roles & responsibilities of relevant organisations defined	Is single authority involved in the implementation of transport sector?
Hong Kong	✗	✓	✓	✓	✗	✓	✓	✓	✗	As there is a single authority responsible for the implementation of transport sector actions, so nothing specific is stated in the document.	✓
Singapore	✗	✓	✓	✗	✓	✓	✓	✓	✗		✓
Durban	✗	✓	✓	✓	✓	✓	✓	✓	✗		✓
San Francisco	✓	✓	✓	✗	✓	✗	✓	✗	✗		
Rajkot	✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✗
Udaipur	✗	✓	✓	✗	✗	✗	✓	✗	✓	✗	✗
Siliguri	✗	✓	✗	✗	✓	✗	✗	✗	✓	✗	✗
Coimbatore	✗	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗
Thane	✗	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗
Mumbai	✗	✓	✓	✗	✓	✓	✗	✓	✓		✗

Assessment of Climate Planning Frameworks

		ClimateResilientCITIES Methodology (2015), ICELI	Climate Action Planning Framework (2019), C40	Guidebook: How to develop a Climate Action Plan for cities in India (2020) , Joint Research Centre, European Commission
1	A common vision aligned with the vision of existing plans and documents			
2	Specific targets for transport sector			
3	GHG emissions are detailed out for transportation sector (Eg by mode)			
4	Inclusion of transport sector in vulnerability assessment			
5	Stakeholders engagement			
6	Sub-sectors covered			
7	Lead agency for implementation of proposed actions			
8	Lead agency to monitor the implementation of proposed actions of transport section			
9	Clearly defined targets to monitor the progress of transportation sector			
10	Funding source for proposed action			
11	Clarity of the flow of funds for implementation of actions			
12	Quantified the benefits and co-benefits of the proposed actions			
13	Prioritisation of proposed actions			
14	Cost of proposed actions			
15	Measured potential of reducing GHG emissions by proposed actions			

Absence of guidelines for sector specific targets

Limited focus on monitoring

Lack of clarity on flow of funds

Cost and Benefits

CAP Evaluation Framework

Based on the literature review, a assessment framework was created to assess how detailed CAPs are going while looking at transportation sector

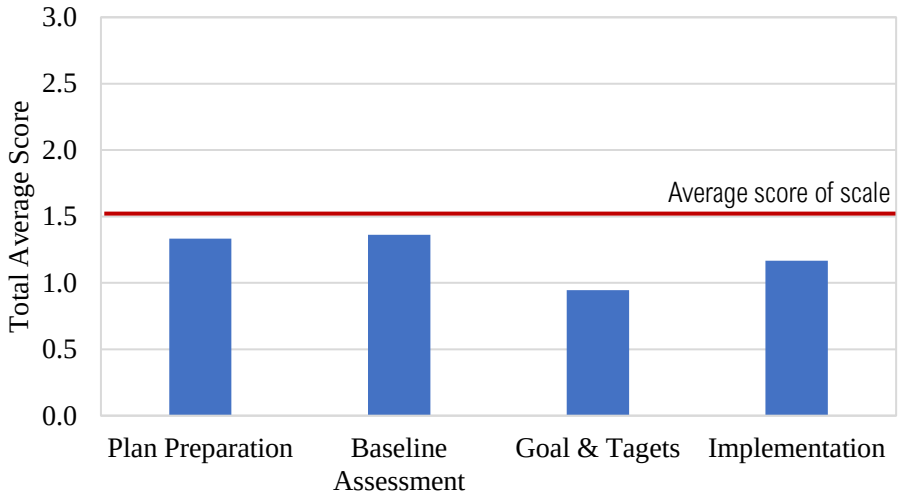
Framework to evaluate the existing CAPs for Urban Transport sector

	Parameters		0	1	2	3
Plan Preparation	1	Inclusion of all sub-sectors	Electrification	Public transport, NMT, Electrification	Public Transport, Electrification, NMT, Parking, TDM	Public Transport, Electrification, NMT, Parking, TDM, Urban Freight
	2	Actions for public awareness and education about the climate change issue	No action			A communication plan is prepared for public awareness and education on sustainable modes of transport
Baseline Assessment	3	Categorisation of GHG emissions type by source for urabn transport sector	GHG emissions from transport sector is not reported	GHG emissions from transport sector at city-level is only reported	GHG emissions are reported by mode in transportation sector	Life cycle GHG emissions are reported by mode
	4	Assessment of impact of climate change on transport	No assessment conducted	Limited assessment conducted with incomplete data or assumptions	Assessment conducted, but data and assumptions may not be comprehensive or recent	Comprehensive assessment conducted with sufficient and recent data and assumptions
	5	Assessment of impact of transport on climate change	No assessment conducted	Limited assessment conducted with incomplete data or assumptions	Assessment conducted, but data and assumptions may not be comprehensive or recent	Comprehensive assessment conducted with sufficient and recent data and assumptions
	6	Assessment of land use change in relation to urban transport	No relationship is estabilised between Land Use and Urban transport sector during vulnerability assessment	Basic analysis and interrelationships are estabilised	Vulnerability assessment is done to assess the impact of climate change on urban transport and land use	Vulnerability assessment by ading layers of land use, urban transport and climate chage impacts like flooding, urban heat etc. is done
	7	Future emission trends forecast	No forecast conducted	Future emissions for only BAU scenarios is done	Future emissions are calculated for BAU scenario and action plan proposed scenario	Comprehensive and detailed forecast of future emission trends with multiple scenarios considered
Goal & Tagets	8	Quantified goals for reduction in GHG emissions from transport sector	There is no specific goal for reduction of GHG emissions from transport sector		Aggregated potential GHG emissions reductions is quantified	Clear and quantified goal for GHG emissions reductions from transport sector is provided
	9	Estimations of potential GHG emissions reduction	No calculations are done to assess the potential GHG reductions from transport sector	Potenstion GHG emissions reduction are quantified for less than 50% of proposed actions	Potenstion GHG emissions reduction are quantified for more than 50% of proposed actions	Potentional GHG emissions reductions are calculated for each action proposed in Climate Action Plan
Action Plan	10	Implementable actions are proposed	More than 50% actions are proposed at the strategic level with no clear targets	Some (less than 50%) proposed actions ar epolciy level actions which needs to be details out for implementation	Some (less than 50%) actions quantified	All proposed action are implementable and quantified accordinglr for adequate tracking
	11	Adaption stratgies for urban transport	No actions are proposed foradaption			Both adaption and mitigation strategies are proposed.
	12	Co-benefits are also quantified	Co-benefits are not identifies	Co-benefits are identified at an aggregate level	Co-benefits are quantified for some indicators (less 50%)	Co-benefits are identified and calculated for all the proposed actions
	13	Quantified targets for actions proposed for urban transport are provided	No targets are provided	Quantified targets are provided for less than 50% of proposed actions	Quantified targets are provided for more than 50% of proposed actions	Quantified targets are provided for all proposed actions
	14	Cost estimation for GHG emission reduction	No cost estimations are done	An overall cost estimation is given for reference	Cost estimations are done forless than 50% of actions proposed is done	Comprehensive and detailed cost estimation for GHG emission reduction with consideration of multiple scenarios
Implementation	15	Identify role and responsibility among sectors and stakeholders	No attempt made to identify roles and responsibilities among sectors and stakeholders	All stakeholders for implementing of actions proposed for urban transport are identified	Role of lead agency is defined, but not the other stakeholder involved	Roles and responsibilites of each implenting organisation is clearly defined
	16	Funding sources are identified	Funding sources for all the actions are not identified	Only funding agency is identified	National or State level schemes are identified under which funds can be availed	Funding source and responsible agency to get the funds are identified

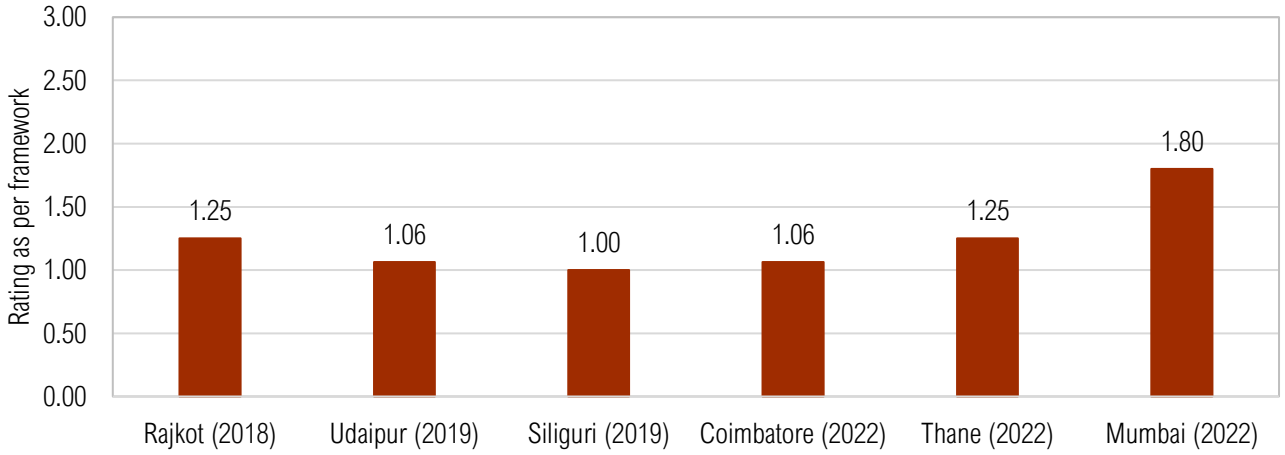
Evaluation of CAPs

Rajkot, Siliguri, Udaipur, Thane, Coimbatore, Mumbai

Average score of the categories



Evaluation of CAPs



The detailing level of urban transport sector in CAPs is very low, below average in all plans. When compared among themselves, Mumbai is the most detailed plan, when looked from transport sector.

Implementation & Monitoring

- Outcome level indicators are used for monitoring (Time lag, multiple factors, limited control)

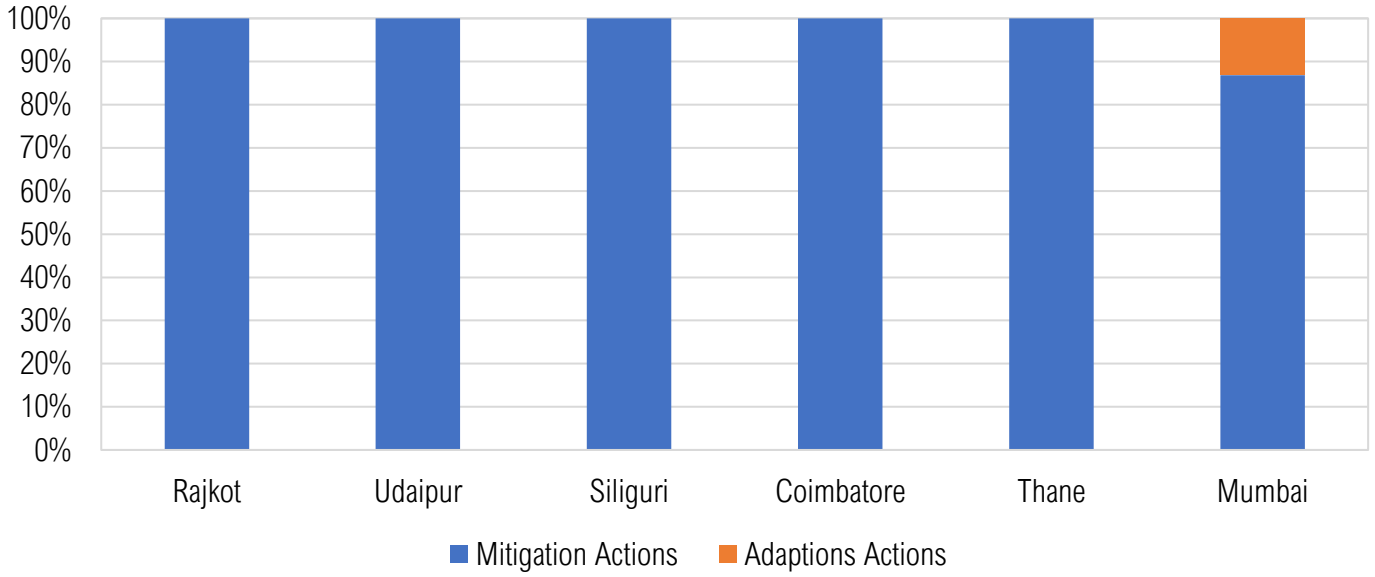
Evaluation of CAPs- Adaption & Mitigation Strategies

Rajkot, Siliguri, Udaipur, Thane, Coimbatore, Mumbai

Adaptation refers to actions taken to manage and adjust to the actual or expected effects of climate change. These measures aim to reduce vulnerability and enhance resilience in response to changing climate conditions. Eg. Building climate resilient infrastructure, early warning systems, alternative strategies etc.

Mitigation refers to actions taken to reduce greenhouse gas (GHG) emissions or enhance their removal from the atmosphere. Eg. Transitioning to renewable energy, promoting sustainable modes of transport etc.

Adaption and Mitigation measures proposed for urban transport sector in CAPs



This indicates that the primary emphasis of Climate Action Plans concerning the transportation sector is on climate change mitigation with little or no focus on adaption.

Experts Views (Semi-Structured Interviews)

Semi-structured interviews with experts were conducted to gather the insights and perspectives of experts on the current approach of Indian cities to integrate transport sector in urban climate efforts, especially in CAPs and CAAPs

Experts Opinion

12 Experts Consulted

in the field of Urban Transport & Climate Change

- Multiplicity of plans
- Lack of statutory backing to CAP

- Need an entity to ensure the overall coordination of urban transport sector
- Clear communication among stakeholders involved

- Identification of bankable projects & creditworthiness of ULBs
- Limited capacity of ULBs to raise funds

- Absence of clear & quantifiable targets
- Limited focus on implementation & monitoring
- Both action-based and outcome-based targets should be there
- Limited focus on adaption strategies
- Need of co-control measure focusing on both GHG emissions & air pollution
- Need a reference list of prioritized strategies

Bankable projects refer to projects or proposals that are considered financially viable and have a high probability of attracting funding from banks or financial institutions.

Creditworthiness of an entity refers to the assessment of an individual, company, or organization's ability to fulfill its financial obligations, particularly in terms of repaying borrowed funds

Current status of CAP implementation

UDAIPUR

Under the ICLEI-led CAPACITIES project, Udaipur implemented two mobility initiatives: a pilot deployment of e-rickshaws and a feasibility study for electrifying the 10.7 km BRT system, focusing on improving last-mile connectivity and improving ridership. There is no other information available online.

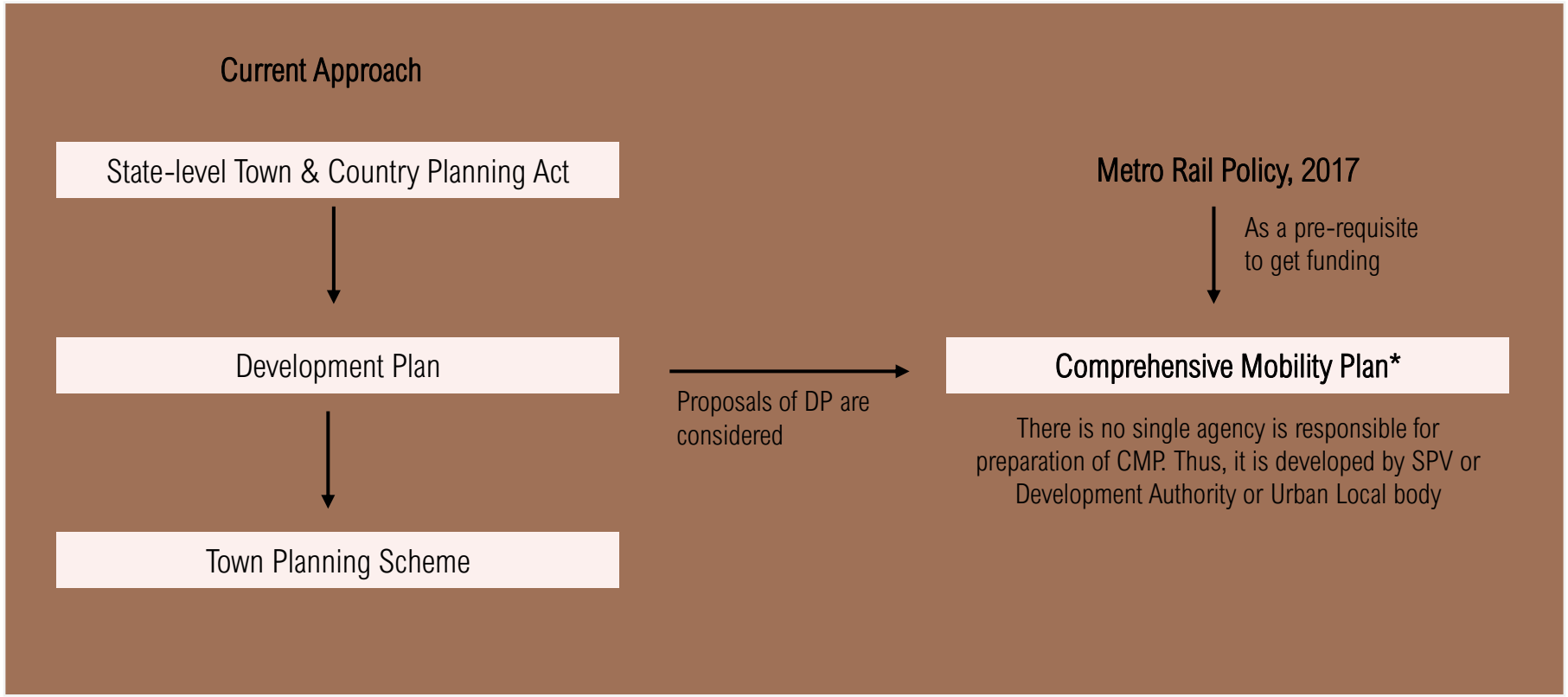
Mumbai

Mumbai has introduced Climate Budget Report in 2024, which includes clear quantifiable targets to implemented. However, only 0.08% of total climate budget (INR 10.2 crores) have been allocated to urban transport for the year of 2024-25 (Brihanmumbai Municipal Corporation, 2024).

Recommendations

Policy-level Recommendation

Both **Climate Action Plan (GHG emissions) and Clean Air Action Plan (Air pollution) should be a part of Comprehensive Mobility Plan** and if a comprehensive Climate Action Plan is being prepared at city level, it can refer CMP. A recommended step for states is to revise their **"Town and Country Planning Act"** to grant statutory recognition to Comprehensive Master Plans (CMPs).



*Reports both GHG emissions & air pollution level due to transportation sector

Policy-level Recommendation

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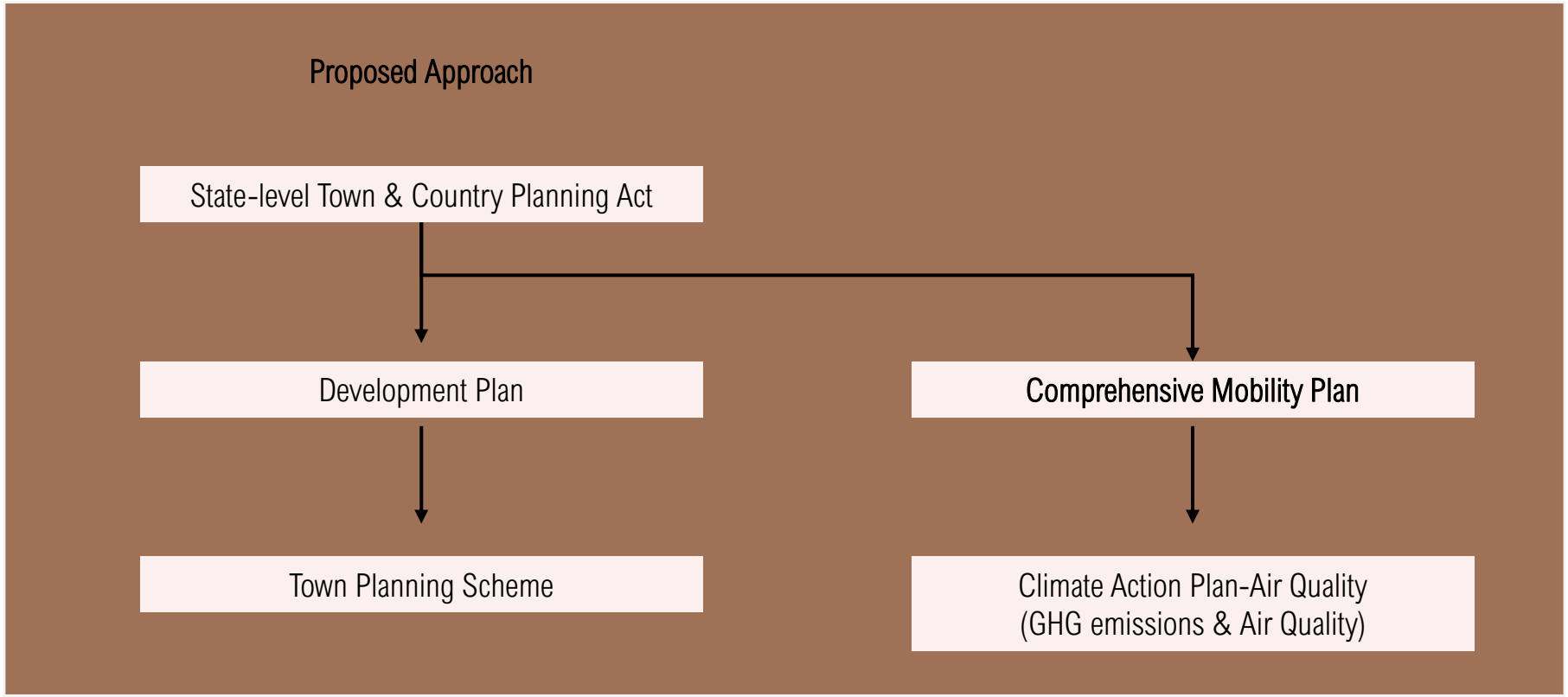

List of data required- Mandatory Data

Mandatory data required

Indicator	Data required	Source
Vehicular data	- Number of vehicles segregated by category - No of vehicles in each category, disaggregated by fuel type - Total electricity and fuel consumption	RTO/Traffic Department Petroleum companies/DISCOM/ULB
Modal share	Modal shares by mode - 2-wheelers (Private); 4-wheelers (Private); Public Transport: Buses, Metro, IPT Aggregators (online)	CMP
PT Ridership data	- Fleet size of metro-rail - Metro-rail routes - Daily ridership - Electricity consumption - Fleet size of buses, by fuel type - Electric bus specification-range - Bus routes - Daily ridership - Fuel/electricity consumption - IPT routes (for shared services)	Metro Rail Corporation Ltd City Transport Corporation CMP

Indicator	Data required	Source
Travel time & speed	- Average travel time by trip purpose /mode - Average speed on roads of different modes	CMP/Google maps
Vehicular Ownership	No of vehicles owned by a HH (segregated by mode, if possible)	CMP/Development Plan
NMT facilities	• Length of footpaths and cycle paths (km) • Presence of PBS system	Traffic department/CMP
Parking Facilities	• Number of total/on street/off street parking unit available for each mode • Road length where illegal parking (As encroachment) is done • Parking fee charged for each transport mode	Traffic Department/Parking Cell in ULB
Freight	• Volume of freight moving within the study area (intra-city movement) by • Mode and type • Average shipping distance within the city boundaries • Type of freight vehicles used in the city, disaggregated by fuel	CMP/Traffic Department/RTO
Air Pollution	• Sources of air pollution	State Pollution Control Board/Clean Air Action Plan
Land Use	• GIS files of land use of the city	Development Authority

Indicators

- % of population who have access to mass transit system within 1 km and how does this change in case of extreme rainfall and in hotspot zones;
- Readiness of public transport authority in terms of providing alternative routes in case of blocking of regular routes due to heavy rain;
- Length of transport network located in areas at risk (e.g. flood/drought/heat wave/ forest or land fire);
- Impact of increased urban heat on electric bus operations and how that will have an impact of public transport operations;

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Thank You