MSRTC

SHAKTI
SUSTAINABLE ENERGY
FOUNDATION

October 2018

Road- Map for Bus Fleet and Infrastructure Development for Maharashtra State Road Transport Corporation (MSRTC)

SGArchitects

SGArchitects
6151/8, Sector D, Pocket 6
Vasant Kunj
New Delhi – 110070
www.sgarchitect.in

Key Contributors:

Sandeep Gandhi
Principal Architect

Satyajit Ganguly
Senior Transport Planner

Kanica Gola
Infrastructure Planner

Pushkar Dhawale
Urban and Regional Planner

Garima Aggarwal
Urban Designer

Kartikay Kochhar
Architect

Acknowledgements

The authors would like to express our gratitude to Shakti Sustainable Energy Foundation.

Shakti Sustainable Energy Foundation works to strengthen the energy security of India by aiding the design and implementation of policies that support renewable energy, energy efficiency and sustainable transport solutions.

We would like to thank Maharashtra State Road Transport Corporation (MSRTC), for their participation as case study examples, for their immense support and cooperation in making the document possible. We deeply acknowledge Shri Ranjit Deol, Managing Director (MD, MSRTC Mr. Sanjay Ganjve, Chief Statistical Officer, MSRTC, Mumbai and Mrs. Sandhya Bhandarwar, Statistical Officer, MSRTC, Mumbai for their guidance and valuable inputs.

Contents

List of Figures

List of Tables

1 Study Background

State Transport Undertakings (STUs) in India are observed focusing mainly on sustaining current operations, with limited resources at hand. They find themselves unable to direct effort towards estimating demand trends, supply gaps and sector status (such as demand catered by competing modes). Thus, they may not be ideally positioning themselves to cater to future requirements. In such a scenario, STUs may face increasing challenges towards meeting current and future fleet and infrastructure upgradation requirements. These challenges include both land and financing constraints.

To address this, STUs need additional capital and technical investments, which needs to be planned for. To tap into potential financing and/or funding resources the STU's need to make a case for requirement of fleet and infrastructure upgradation. This mandates the need for a long-range plan backed by a vision, and a roadmap to achieve that vision in both the long and the short term. However, to affect the overall revamping and improvement in the financial health of STUs, simple induction of fleet may not be sufficient. What is required is a detailed understanding and action on fleet, operations, service and infrastructure requirements, over a longer term. To achieve this, STUs require to focus on developing long range development plans as well roadmap to achieve the goals set in the development plans.

Both the central government and the Association of State Road Transport Undertakings (ASRTU) have set up challenging goals for the STUs and are offering to support them in achieving the same. As a part of this initiative, this study is being undertaken to help revive and reposition bus based public transport in India. To achieve the aim of this study, a road map development exercise is proposed to be undertaken for Maharashtra State Road Transport Corporation (MSRTC). To have a credible demonstrating effect the findings from the exercise need to be both robust and comprehensive.

This roadmap development exercise proposes to provide quantified and comparative, scenario-based data to the decision and policy makers and seeks to demonstrate both the methodology and the utility of producing a road map for development of MSRTC. A critical objective of this study is the development of a bus fleet upgradation plan for the corporation and provide policy level recommendation for bus service improvement in in terms of projected - recommended fleet size, land requirement, annual budgetary provision, staff strength, etc. – in different scenarios. This estimation and projection are governed by a current condition and expected scenario. Current conditions are defined by data such as existing fleet strength, number of trips catered, fleet age, etc., while different scenario is defined by a number of variables such as desired mode share, projection of route length, projection of number of routes, desired efficiency, desired occupancy, etc. Because estimation of policy recommendations in multiple scenarios involves complex calculations this roadmap is based on modelling MSRTC's fleet requirement using the fleet estimation tool developed by SGArchitects, Delhi. It is expected that the outputs from the tool will contribute to an informed short, medium and long-term planning to achieve the vision and the goals for the corporation which will be able to use the findings of this study, to tap additional resources and funds.

This report presents the estimation of fleet and bus infrastructure for MSRTC under three scenarios, which are: Business as usual scenario, mode share retain scenario and desirable scenario. Section three of this report discusses development of the road map in detail with project methodology. Section four, of the report highlights the development of bus fleet upgradation tool, components and its functionality. And section six focusses on the outcomes obtained through the tool for two different scenarios generated for MSRTC followed by the profitability factors and comparison of the outputs generated for the different scenarios.

2 Introduction

The State of Maharashtra is situated on the south western coast of India, covering an area of 307,713 Sq.km. The state has a population of around 112 million (Census 2011) inhabitants and it is bifurcated into 35 districts (Figure 1).

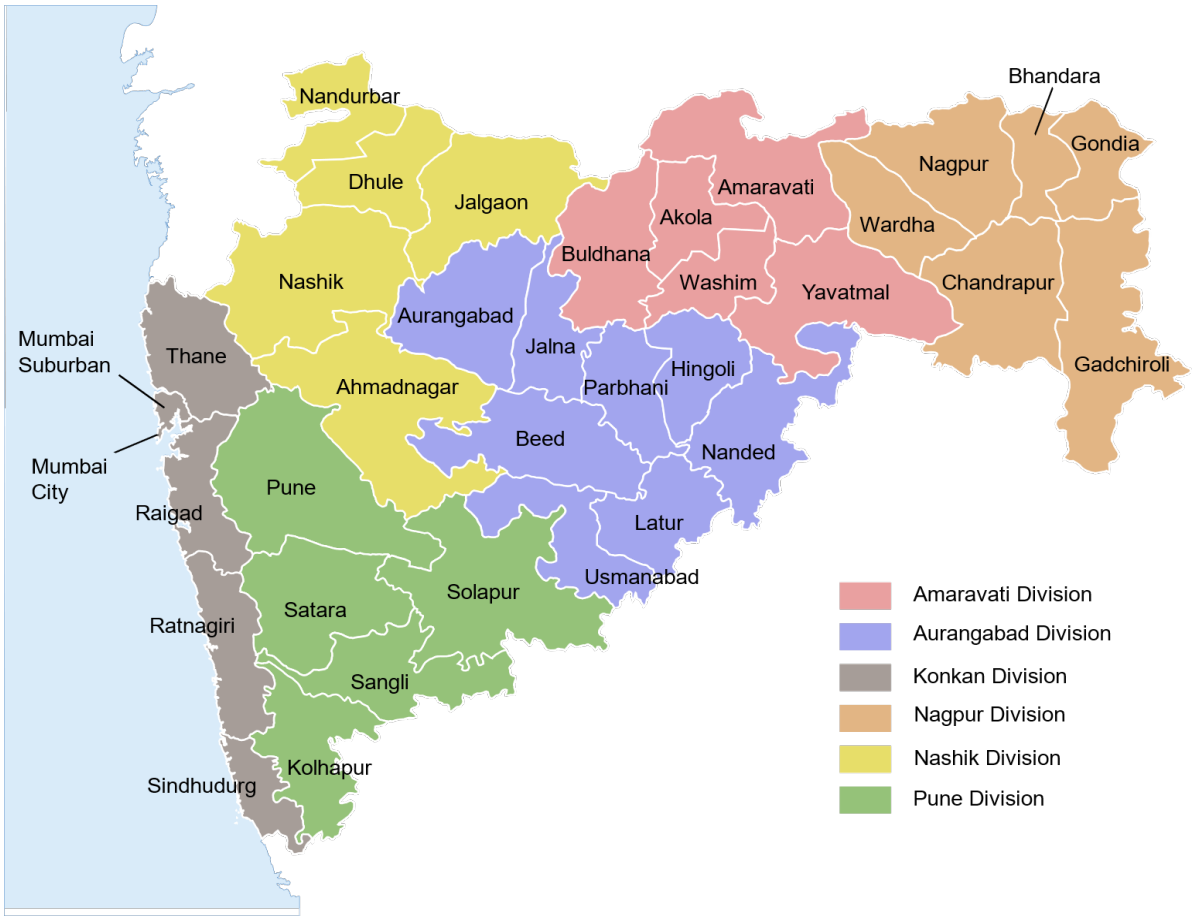


Figure 1: Maharashtra state and district Map

MSRTC is a leading passenger road transport organization established by State Government of Maharashtra as per the provision in Section 3 of RTC Act 1950. MSRTC operates state bus service of Maharashtra and covers more than 60 lakhs kilometers daily across the state. At present the corporation has 1.07 lakhs employees. MSRTC has 16,500 buses which ferry 7 million passengers daily on 18,700 routes.

Figure 2: Maharashtra State road transport Corporation – MSRTC

The Administrative Structure of MSRTC comprises of One Central Office, Six Regional Offices, 31 Divisional Offices and 256 depots. Besides this MSRTC have 3 Central workshops, 9 Tyre Retreading Plants, 1 stores supply unit and 1 Printing Press and 1 Central training Institute at Bhosari, Pune. It serves routes to towns and cities within Maharashtra and adjoining states. Apart from locations within the state of Maharashtra, the MSRTC service also covers destinations in neighboring state.

3 Objectives and Methodology

This study is being undertaken to fulfil the following objectives:

1. To estimate the performance of MSRTC in the future based on past trends. These estimates shall be made against key performance indicators such as demand catered, mode share, fleet strength, operational efficiency, financial efficiency, etc.
2. To assist MSRTC in defining a desirable scenario.
3. To estimate the future requirements for MSRTC in order to achieve the desirable scenario. These requirements are in terms of parameters such as fleet size, land requirement, depot and terminal infrastructure development requirement and investment requirement.
4. To produce data that will be useful for MSRTC in developing a long-term plan for investment and efficient asset utilization. For example, with the knowledge of annual budgetary requirement, MSRTC can plan a long-term strategy for tapping funds both from the State as well from funding agencies such as World Bank and ADB. With the knowledge of annual additional land requirement, the current land bank with MSRTC can be utilized and the land that is expected to remain unutilized can be turned in to a source of revenue for a known time period.
5. To develop a profitability or a loss reduction scenario for the Corporation. This scenario shall identify and quantify the steps that may be undertaken to achieve specific loss reduction targets for the organization.
6. To propose an action plan for influencing identified factors for loss reduction. This action plan should help implement strategies to achieve loss reduction targets estimated as a part of this study.

The methodology for meeting the above objectives for the study is as following:

1. Use the existing data reported by MSRTC to plot trends, to predict the consolidated performance of the STU over the next 33 years both in terms of meeting passenger demand and in terms of financial performance. This scenario is referred to as the Business as Usual Scenario (BAU).
2. Use, projections based on trend for estimating of future demand (in terms of number of trips) that shall be catered by MSRTC in a BAU scenario.
3. Using available data on population growth rate and other factors, project the future demand of trips in the State (including trips from other states), also projecting the demand based on trip characteristics (trip length, trip purpose, rural, urban). This not only allows more accurate estimation of future demand but also makes available to MSRTC data changing trends in the future.
4. Estimate the demand that MSRTC will be catering in the future if the current mode share is retained. Compare this demand with the demand expected to be catered by the Corporation based on the current trend.
5. Based on this comparison, generate an understanding and report to the Corporation if the current trends in operational and investment factors will help the corporation retain or expand its market share in the future.
6. Based on the current trends, estimate and report to the Corporation on the projected financial health of the Corporation
7. Include levers for scenario building in a relevant tool and explain the possibilities of building different scenarios to the MSRTC officials. Subsequently use this information to develop a desirable scenario with MSRTC officials. These tools include mode share, operational efficiency, staff to bus ratio, occupancy, average passenger trip length, average route length, etc.

8. To Estimate the performance of MSRTC in a desirable scenario, both in terms of passenger trips it will cater (mode share) and in terms of financial performance. Also estimate the road map to the desirable scenario, listing the requirements in terms of Fleet expansion, bus infrastructure (depot and terminal) development, associated land requirement, and investments required.
9. Develop a profitability scenario by modelling variations in critical factors such as occupancy, staff to bus ratio and fleet utilization. Using this annual loss reduction and efficiency improvement targets shall be generated.
10. Generate an action plan for influencing efficiency improvement and increase in patronage – factors that will contribute to loss reduction. This action plan identifies loss reduction strategies through literature review, detail actionable points such as planning, financing and implementation, and provide an indication of expected outcomes.

4 Fleet Estimation Tool

The fleet estimation tool is designed to assist state transport undertakings (STU) in forecasting demand in different scenarios to allow long range planning to address the projected demand including and associated infrastructural, fleet and financial requirements.

4.1 Tool Architecture

The fleet estimation tool has been developed as a spread sheet-based model (Figure 3) with three basic elements – a dashboard which serves as a user interface and data input module, a default sheet, which provides a scenario building interface and an output sheet which presents outputs as both as numbers and graphs. The tool architecture is based on an annual projection/estimation basis and it generates annual outputs for a 33year period from the date of input. It also allows users to use older data (older than the year of estimation), and projects these to the current date (to be further used for future projections) based on growth rates provided by the user. The tool is designed to provide macro or state level outputs (for both inter district and intra city operations), however it can also be tweaked to provide district level results.

	CURRENT YEAR		
S.No	Item	Value	Error Checl
1	Current Year	2018	OK
	FLEET DETAILS		
		Bus Type 1	Error Checl
	Item	Mini/ Midi buses	
2	Current Intra City Bus Fleet	0	ERROR
3	Current Intra City per bus seating Capacity	0	ERROR
4	Current Inter City Bus Fleet	507	OK
5	Current Inter City per bus seating capacity	31	OK
	FLEET UTILIZATION AND OPERATIONAL EFFICIENCY		
	Item	Value (%)	Error Checl
6	Current year fleet utilization (Intra City)	90%	OK
7	Current year fleet utilization (Inter City)	90%	OK
8	Current year operational efficiency (Intra City)	99%	OK
9	Current year operational efficiency (Inter City)	99%	OK

Figure 3: Fleet estimation Tool-Architecture

4.2 Working and Methodology

The tool estimates a total of 37 outputs (ranging from annual budgetary requirements for fleet and infrastructure to new buses to be purchased, budgets required and profit after purchase: Annexure-10.3) using 81 inputs (Annexure 10.1) and 140 default values (Annexure 10.2). The user is required to insert the data in the dash board tab and can obtain the results under output tab. The default tab includes a list of (editable by the user) default values or assumptions used in estimating the output values. These includes target mode shares, annual rates of change, fleet and infrastructure development cost, etc. The tool uses a series of validated algorithms to input values and the default values to generate output for each successive year. Each year estimates form the input for successive

year estimates, thereby generating annual output values for 33 successive years, which are then presented as a table and graph for each of the 37 outputs. Figure 4 presents a diagrammatic representation of the basic tool working methodology.

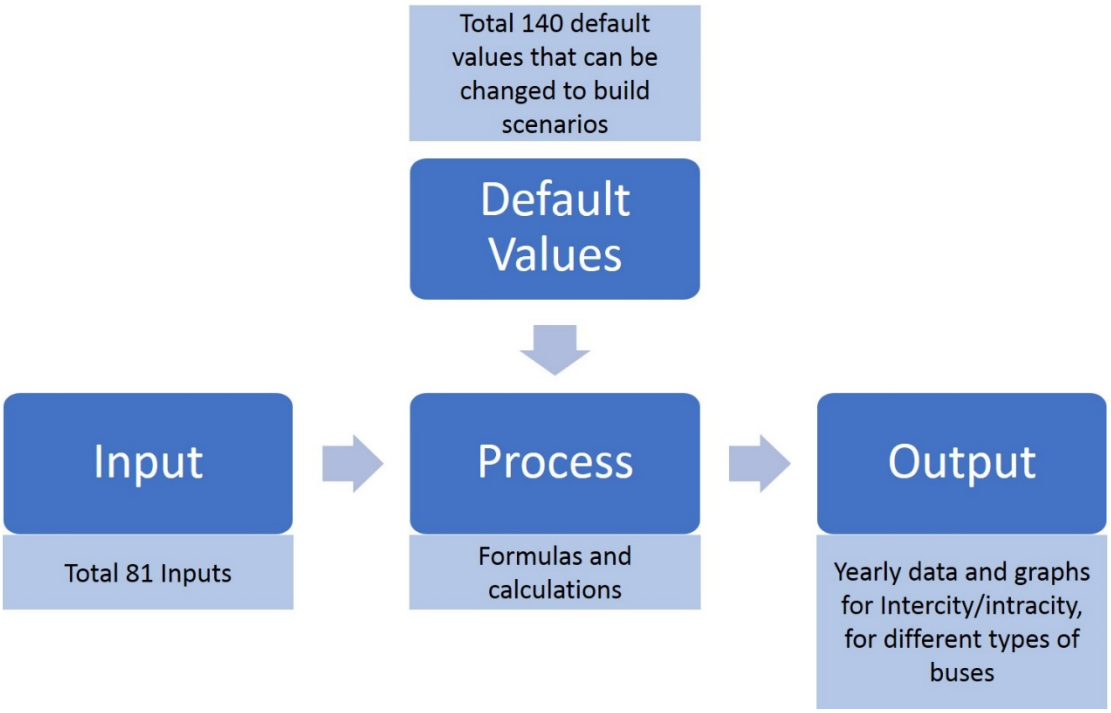


Figure 4: Fleet estimation tool- Working and methodology

4.3 Tool Components

The three main components of the tool described above have been described in detail in the following sub sections.

4.4 Outputs

A total of 37 outputs present results under the following three broad categories:

1. Future (annual) fleet size requirement categorized by service type and by vehicle type.
2. Future (annual) land requirement for depots and terminal classified by service type
3. Future annual budget requirement i.e. cost of fleet acquisition and infrastructure development classified by service type.

In addition, outputs are presented as rate of change, depicting growth/decline in different public transport mode share, staff requirement, efficiency, etc. A list of all outputs has been presented in Annexure10.3

4.5 Inputs

To generate the outputs, the model requires a list of data inputs along with assumptions (such as expected/desired mode share or efficiency) which define a scenario. The data input in dashboard has been designed keeping in mind the easy availability of data with the STU's and from other sources such as census. The user defines the current year and the data year. The model then projects the data from the data year (data such as census data is typically a historic data) to the current year and this is used in all output estimates. A total of 81 data inputs under the following 8 categories is required. Table 1 lists the 8 categories and the respective components under which the data is inserted by the user (Annexure10.1).

Table 1: Fleet estimation tool – Input data Categories

S.no	Input Category	Components	Source
1	Fleet Detail and Average Seating Capacity	Intercity and Intra city	STU
2	Fleet utilization and Operational efficiency	Intercity and Intra city	STU
3	Fleet Age	Intercity and Intra city	STU
4	Trip and Profile Data	Population (Urban and rural), Mode share (Bus and IPT), work, non-work (Bus and IPT) Education trips, Trip-lengths, Nature of tourist trips- *applicable separately for less than and more than 10 km Inter and Intracity*	Census
5	STU data	Daily STU passenger trips, daily operated routes, Number of one-way Bus trips on the routes, Average route length and %load factor- *applicable separately for Inter and Intracity*	STU
6	Growth Rates	Urban, Rural and Tourist	Web -Reports and Studies, tourism reports
7	Staff Ratio	Intercity and Intra city	STU
8	Cost and Earnings	Earning per Km, Cost per Km, operating cost, Ticket price per km, earning per passenger, average trip length per passenger - *applicable separately for Inter and Intracity*	STU

Even though the tool relies on the data provided by MSRTC as well as other secondary data for inputs in the model, not all data required to be input in the model (such as average passenger trip length) is reported by MSRTC. However, these can be derived from the existing data as explained later in this chapter.

4.6 Default Values

The default values are the values of various parameters to be used in the tool for analysis and for defining different scenarios (such as different growth rates). These values are based on standard accepted norms. These values are editable and if required the user can change these values by accessing the default tab on the spreadsheet. Thus, changes to these values are required only when different scenarios need to be generated and compared. A total of 140 default values are used by the tool and have been listed in Annexure 10.2. These can be further categorized under thirty defaults handles as presented in table 2:

Table 2: Fleet estimation tool – Default Value Categorization

S.no	Default Handles	Units	For
1	Fleet Utilization Improvement	Percentage	Intercity and Intra city
2	Efficiency Gap and Income Level	Percentage	Intercity and Intra city
3	Expected Life of Bus	Years	Intercity and Intra city

4	Mode share: STU-buses, Private buses and IPT	Percentage	Less than 10 km and more than 10 km- Intercity and Intra city
5	Rate of Change in Mode Share: STU-buses, Private buses and IPT	Percentage	Less than 10 km and more than 10 km- Intercity and Intra city
6	Percentage of Non-work trips	Percentage	Intercity and Intra city
7	Non-work trips by bus and IPT	Percentage	Intercity and Intra city
8	STU city trips	Percentage	Intercity and Intra city
9	Educational trips	Percentage	Intercity and Intra city
10	Non-work trips by bus originating from state	Percentage	Intercity and Intra city
11	Work trips by bus originating from other state	Percentage	Intercity and Intra city
12	Target occupancy	Percentage	Intercity and Intra city
13	Trip length and annual rate of change	Number / percentage	Intercity and Intra city
14	Average number of trips per bus per day / Rate of change	Number / percentage	Intercity and Intra city
15	Route length / annual rate of change	Number / percentage	Intercity and Intra city
16	Bus cost	Rupees	Intercity and Intra city
17	Revenue from Scrapping	Rupees	Intercity and Intra city
18	Land Requirement	Square meters	Intercity and Intra city
19	Infrastructure cost	Rupees	Intercity and Intra city
20	Infrastructure capacity (Depot / Terminals)	Number (Buses / Bays)	Intercity and Intra city
21	Factor to relate terminal capacity to bus fleet	Percentage	Intercity and Intra city
22	Non-STU city buses using Intercity Terminal	Percentage	
23	Buses by Category - Mini/regular/Luxury (existing or Proposed)	Percentage	Intercity and Intra city
24	Average seating Capacity	Numbers	Intercity and Intra city
25	Rate of Change in Occupancy	Percentage	Intercity and Intra city
26	Average staff numbers and annual rate of change	Number / percentage	Intercity and Intra city
27	Operational efficiency	Percentage	Intercity and Intra city
28	Buses per route / annual rate of change	Number / percentage	Intercity and Intra city
29	Operational hours	Hours	Intercity and Intra city
30	Staff Salary (Avg.)	Rupees	Intercity and Intra city

4.7 Data collection

The fleet estimation tool requires a series of secondary data inputs. Based on this data the tool computes the projected scenarios. The two broad categories of data required for the tool and their use in output estimation has been described below.

1. Latest census based demographic data from the State. This data is used to project demographic profile of the state (such as population data, urbanization) over the next 33 years. This helps generate the overall demand in terms of daily trips. This is further bifurcated as inter district and intra city trips, trips by different modes, trips by purpose and trips by length. Such bifurcation allows application of trip characteristic specific growth rates to generate more realistic projections.

2. Data for current bus fleet being operated by the STU. This includes details on fleet size, fleet age, %load factor, efficiency, fleet utilization, etc. Current fleet data (STU) is used to estimate expected fleet size for the state over the next 33 years in a business as usual scenario. This when compared to estimated fleet requirement in a defined scenario (such that based on a defined expected mode share in the horizon year) over the same period shall provide expected gap in required operational bus fleet on an annual basis.

4.8 Basis Of estimation and Scenario Building Factors

The Fleet estimation tool generates estimate of fleet size required in each projected year based on expected bus trips, average passenger trip length, expected %load factor, average run by each bus and expected fleet utilization. All other outputs are generated based on this projected fleet size. This includes staff requirements, Infrastructure requirements, land and budget. Average daily bus trips are estimated based on population (urban and rural) of the state, growth rate trend applied (urban rural and tourist) and the total trips (non- work, work and education) catered. Figure 5 presents basis of the fleet estimation and the components and data inputs involved in the process.

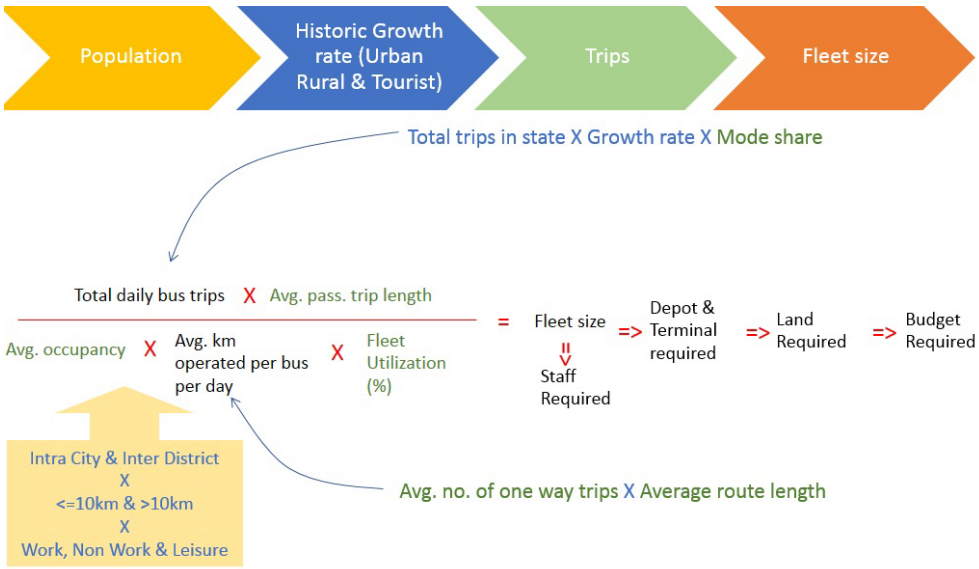


Figure 5: Fleet estimation Tool- Basis of estimation

The objective of the fleet estimation and road map development exercise is to estimate the fleet requirement in each horizon year along with associated investment and infrastructure development requirement over the next 33 years. Now, infrastructure requirement is dependent on the fleet size and infrastructure development needed. Thus, if fleet size requirement is known, we can determine the annual investment and infrastructure development requirement.

As discussed earlier, an inventory of data and values is required to be input in the tool to estimate annual fleet and budgetary requirement for both intra and intercity services. However, all this data (which mainly involved mean values) are not directly reported by MSRTC and nor was it available from secondary sources. This included, average passenger trip length, average kilometers operated by per bus per day, average one-way trips per bus per day, average route length etc. the breakup of the data in these values is essential to include levers in the tool for scenario building.

Even though this data was not directly reported, it can be derived from available data. Figure 6 presents calculations undertaken to estimate these missing values for MSRTC intra and inter- city operations respectively. The values highlighted in green are the ones directly reported by MSRTC or available in secondary data. Values highlighted in red are the ones missing or estimated using the reported values in the given formula, while values highlighted in blue are estimated values from previous formulas used in that formula.

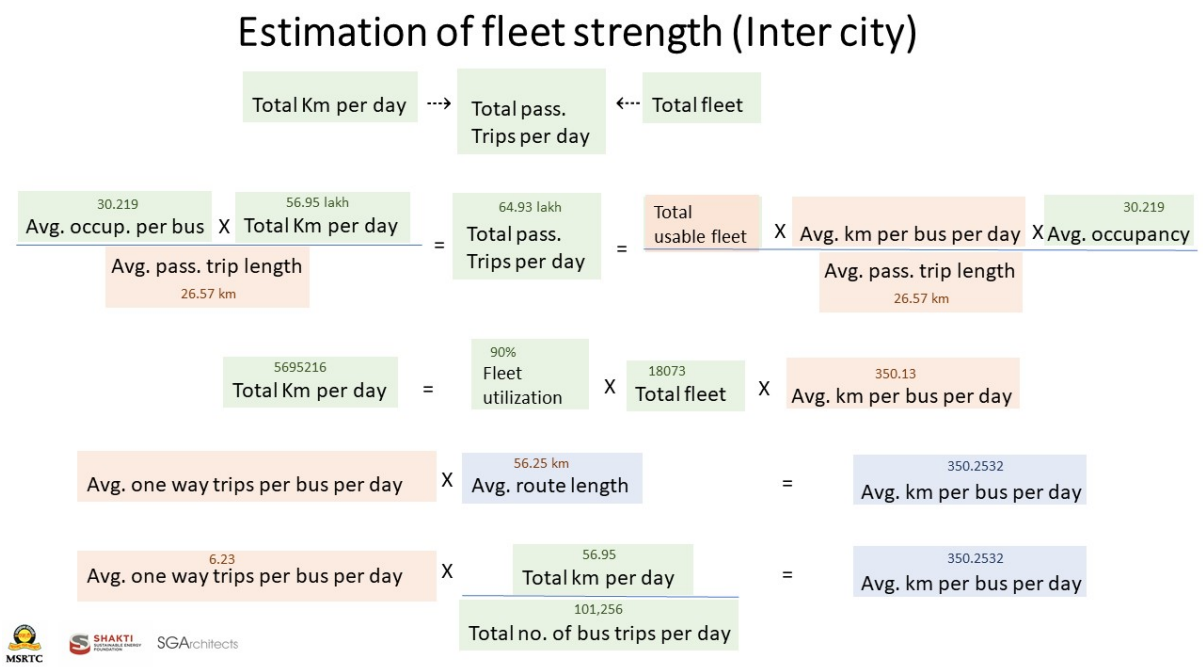


Figure 6 Estimation of fleet strength (intercity)

Average passenger trip length (both for inter and intra city services) estimated as part of formulas presented above is critical in estimating annual revenue for MSRTC. This when multiplied with the average per km passenger fare provides an estimate of total annual fare box revenues for the corporation. However, fare box revenues breakup as inter and intracity revenues is not available. Also, the average passenger fare is not found to be a usable value for estimating fare box revenues because of the slab rates. Thus, exact average per passenger per km fare would be based on the trip lengths of

the passenger and thus needs to be derived from the reported revenue data. This derivation has been presented in Figure 7. This derivation is also based on the assumption that current non-operational revenues and costs are a negligible component for the EPK and CPK values provided and can thus be ignored from these estimates.

Fleet size requirement is dependent on demand in terms of passenger trips that needs to be catered and number of kilometers that all buses cover in a day. Which in turn is dependent on the characteristics of the passengers. There are several parameters that effect the fleet size, total km per day and the passenger trips that need to be undertaken per day. These parameters are dynamic in nature and thus the sound understanding of their projections is important to correctly project fleet requirement and associated factors. Some of the key factors are:

- Expected population growth rate by trip type
- Expected fleet utilization
- Expected occupancy
- Expected efficiency (or vehicle utilization)
- Expected number of routes
- Expected average passenger trip length
- Expected average no. of seats per bus
- Expected average route length
- Expected mode share of the STU (by trip type)

Similarly, a number of factors determine the investment requirement projection, given a set of fleet and infrastructure requirement. These factors relate to operational profit/loss for the STU. These are:

- Expected cost per bus (for purchase)
- Expected per bus depot and terminal development cost
- Expected scrap cost of aged buses
- Expected staff to bus ratio
- Expected average per staff cost to STU
- Expected average ticket price
- Expected operating cost per km

The projected fleet requirement for a given year values for the above parameters need to be known for that year. Thus, understanding the relationship between fleet and investment requirement and the above parameters is critical. This relationship has been explained through formulas presented below. Also, the value of each of these parameters in the current year is required to be known for the projection to be achieved. All these parameters are not reported in the MSRTC recorded data. However, their values can be extracted using the relationship they have with other reported parameters. These expected values have also been presented below (Figure 7) along with the said relationships.

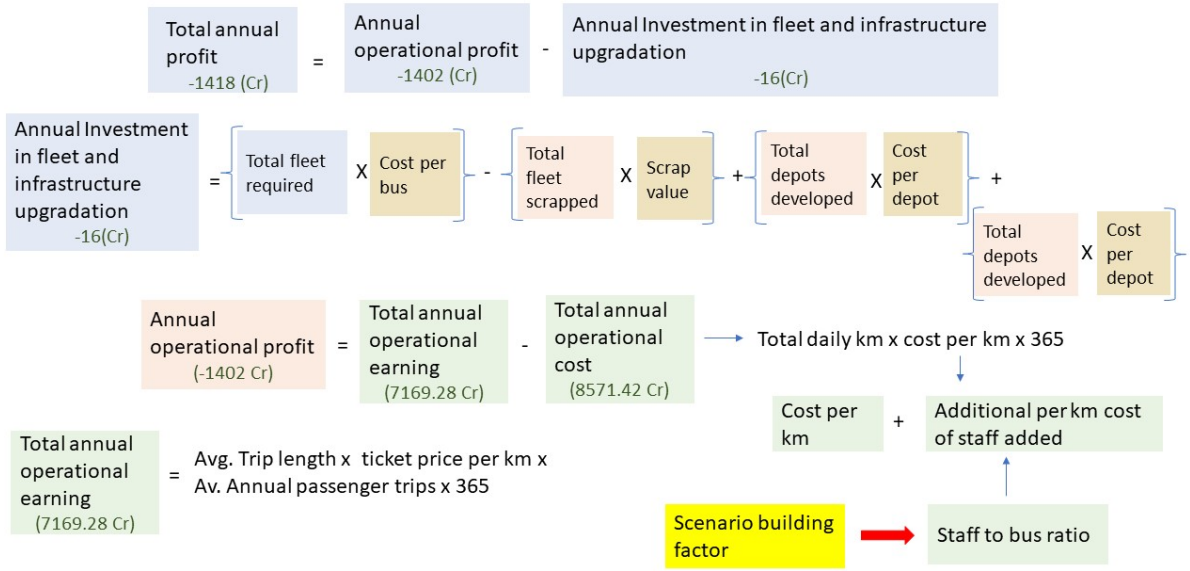


Figure 7 Cost and earning assessment

5 Interaction with STU and Data collection - MSRTC

The study initiated with the aim to develop roadmap plan for MSRTC. It was decided to kick off the project through a meeting with key officials of MSRTC and collect required data basis on which fleet estimation plan shall be developed. According to the methodology discussed in previous section, site visit to MSRTC was undertaken in November 2017.

5.1 Site Visit /Meeting with MSRTC

The first site visit was held on 20th November 2017 to 21st November 2017 at MSRTC office, Mumbai – Maharashtra. Mr. Sandeep Gandhi and Mr. Pushkar Dhawale from SGArchitects conducted the site visit and interacted with the MSRTC concerned officials. During this visit a number of MSRTC officials were met. Figure 8 presents a glimpse of meeting and Interaction with MSRTC officials during the site visit.

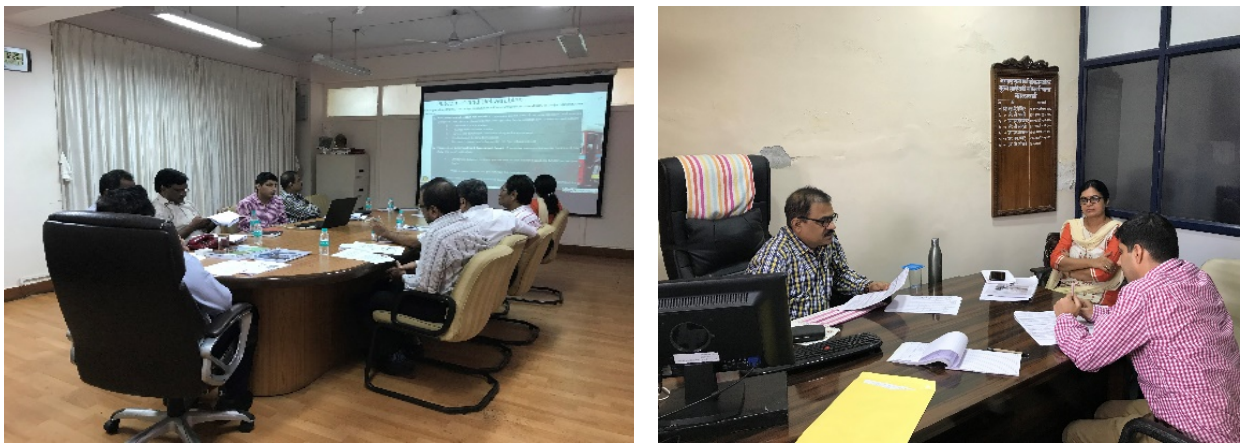


Figure 8: Interaction with MSRTC officials during site visit and data collection

The agenda of this visit was to introduce the team, present the objectives, methodology and timelines of the project. Additionally, the data requirement for the project was also presented and feedback sought on desired outputs and format of the same. A working mechanism agreed upon with the STU during the visit. The idea behind such a working mechanism was to allow close co-ordination for data collection and ensuring an active feedback mechanism. MSRTC supported the project team by providing more than 90% of the secondary data requirement during the very first visit by the project based on the checklist provided to both the STU's. The remaining data was provided within a week through mail or through other mean. A data collection form/check list was prepared for the study (Annexure 10.13) and the same was presented to the coordinating team for further action and feedback. This STU data broadly comprised of the following:

1. Current bus fleet Size (Intracity and Intercity)
2. Type/ Categorisation of Bus fleet (Mini/Midi, Standard/Ordinary and Luxury Coaches) for Intracity and Intercity.
3. Current year fleet utilization (Intracity and Intercity);
4. Current year operational efficiency (Intracity and Intercity)
5. Percent of fleet size – Age wise (Intracity and Intercity)
6. Total STU trips on daily basis (Intercity and Intra city- Urban /rural)
7. Total One-way trips on daily basis (Intercity and Intra city)

8. %Load factor (% of seating capacity) for intercity and intracity
9. Average route length
10. Average trip length
11. Total vehicle kilometres covered per day
12. Current bus ridership
13. Average speed of buses
14. Route Length data of the various routes
15. Current average staff per bus for the STU
16. Annual operational cost breakup
17. Annual revenue generation breakup.

For Infrastructure gap assessment separate forms/checklist developed for the STU's existing bus terminals and depots were also given to the STU officials (Annexure 10.4,10.5). These forms were presented on site to the concerned official for reviewing. After scrutinizing the forms, the required modifications were incorporated by the project team and the revised forms were handed to the STU official for its further circulation to each individual terminal and depot managers. The details of these meetings have been listed in the meeting minutes and the same have been presented in Annexure 10.9.

5.2 Data and Context

As discussed in previous sections, the fleet estimation tool uses State and STU specific data to generate outputs which can be helpful for long range planning by a STU. For Maharashtra, this data was derived from the following sources:

1. MSRTC and other concerned agencies such as RTO's, transport departments.
2. MSRTC administration report (2015-2016).
3. Data available on web which constituted census level population (2011) and trip data extracted from Tourism survey report of Maharashtra.

This data constituted not only the static numbers such as fleet strength, at a given year (ranging from 2007 till 2017) but also included growth rates and trend information which could be used to project the numbers to a base year which was selected as 2017. Excerpts from this data have been listed in Table 3 and Table 4 respectively.

Table 3: Collected Data

Data Collection	MSRTC & Other Agencies	Source
Fleet strength	18634	MSRTC
Fleet utilization	90%	MSRTC
Vehicle utilization	99%	MSRTC
Trips catered per day	66.95 Lakhs	MSRTC
%Load factor	70%	MSRTC
Vehicle to staff ratio	6.240	MSRTC

Data Collection	Online source & reports	Source
Population	11.42 Crores	Census 2011
Mode share	8.01%	Census 2011
Urban population growth rate	2 %	Maharashtra– Tourism Survey report
Rural population growth rate	1%	
Tourist growth rate	11%	

Table 4: Growth rate and demographic data for Maharashtra

State-wide data with reference to populations and number of overall daily trips in the State was collected through literature review, research papers, reports and studies available in the web. This included State demographics – Population (urban and rural), work trips from Census Data, urban rural and tourist applied growth rates etc. In the process the team identified key documents that are referred for secondary data collection and literature studies. Some of these are as following:

1. MSRTC Administration Report 2015-2016.
2. Review of the performance of State Road Transport Undertakings (Passenger services) – April 2012 to March 2013 by Ministry of Road Transport and Highways (MoRTH) 2014.
3. Review of the performance of State Road Transport Undertakings (Passenger services) – April 2013 to March 2014 by Ministry of Road Transport and Highways (MoRTH) 2015.
4. State Transport Undertakings: Profile and Performance (2009 -10) Central Institute of Road Transport (CIRT) 2011.
5. State Transport Undertakings: Profile and Performance (2010 -11) Central Institute of Road Transport (CIRT) 2012.
6. State Transport Undertakings: Profile and Performance (2011 -12) Central Institute of Road Transport (CIRT) 2013.
7. State Transport Undertakings: Profile and Performance (2012 -13) Central Institute of Road Transport (CIRT) 2014.

Even though significant data was available from multiple sources, critical information was missing. This included mode share bifurcation between private and MSRTC buses operating in Maharashtra. This information was generated by contrasting census data with MSRTC data. For example, census provides data on total bus trips, while MSRTC data included daily ticket sales (representing MSRTC trips). The difference of the two was used to generate data for relating to private bus trips in the state. Proxy indicators were used for detailing and bifurcating other data such as fleet age on intercity and intra city routes (fleet age details for overall MSRTC fleet were known).

6 Tool Based Projections for MSRTC

The data collection was followed by generating future projection for MSRTC. The forecasting was distributed in two broad parts.

1. In the first part of the exercise, historic trend of MSRTC was captured through the 10-year historic data received from STU.
2. In the second part basis the past trend - future scenario building was undertaken. The following sections elaborates this process.

6.1 Trend Analysis - Part 1

To judge the health and status of development of MSRTC over the years STU historic trends were developed for MSRTC, basis the MSRTC performance trends for the years 2007 to 2017, collated during secondary data collection. This data included MSRTC performance indicators in terms of fleet size, fleet utilization, vehicle utilization, passenger carried per day, number of routes etc. This data over a decade was then used to generate a past trend for a few indicators. However only four indicators were useful in estimating fleet size, hence the rest of the data was not used. These were fleet size, fleet utilization, operational efficiency and routes operated. Figure 9 presents the MSRTC historic trends against the respective indicators.

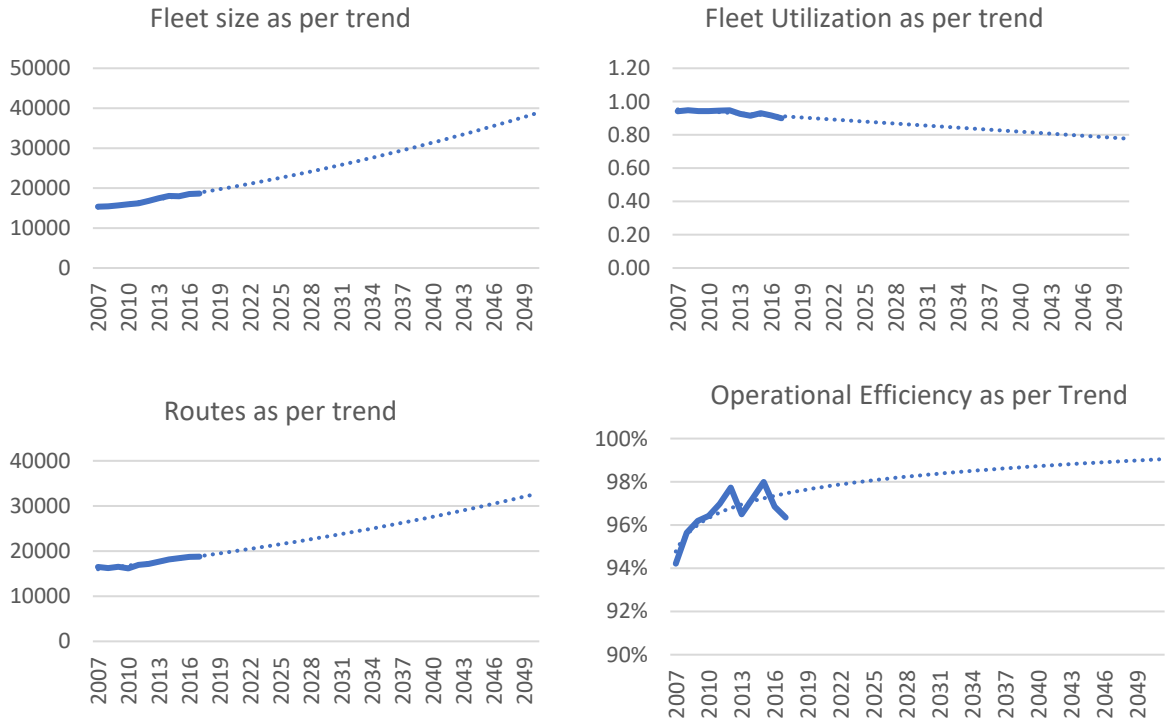


Figure 9: MSRTC Historic trends

- For all the four indicators, historic trends were derived till 2051 basis MSRTC historic data. Fleet size and routes are expected to increase gradually over the years. Where fleet size is expected to grow from 15352 in 2007 to 31492 in 2051 and routes from 16482 in 2007 to 32872 in 2051 with a sudden drop to 16170 in 2010.
- There is a gradual decline in fleet utilization from 94% in 2007 to a constant of 90% by 2051.
- Although operational efficiency went through sudden fluctuations from 2011-2017, it is expected to face an overall increment from 97% in 2007 to 102% by 2051.

6.2 Scenario Building – Part 2

Based on the requirements of MSRTC and existing current year data, three broad future scenarios were modelled in the tool. These scenarios have been discussed in detail below.

6.3 Scenario 1 – Business as usual Scenario

Business as usual scenario - forecasted fleet estimates based on the current trend of MSRTC. This current trend is applied to the current year data provided by MSRTC. To validate future outputs in line to the projections obtained from historic trends, both current trend and past trend are required to be matched. For this, the historic trend was replicated in the current trend.

6.3.1.1 Replication of Historic trend

The current year trend (2017) was replicated for the same indicators. For this, the model was used to project data from 2018 up to 2051 (33-year projection). This was combined with the MSRTC past - trend generated for period between 2007 and 2051. Subsequently the default values were tweaked to replicate the historical trend (in terms of rate of change, target values etc.). Figure 10 presents the MSRTC current trend matched with the past trend.

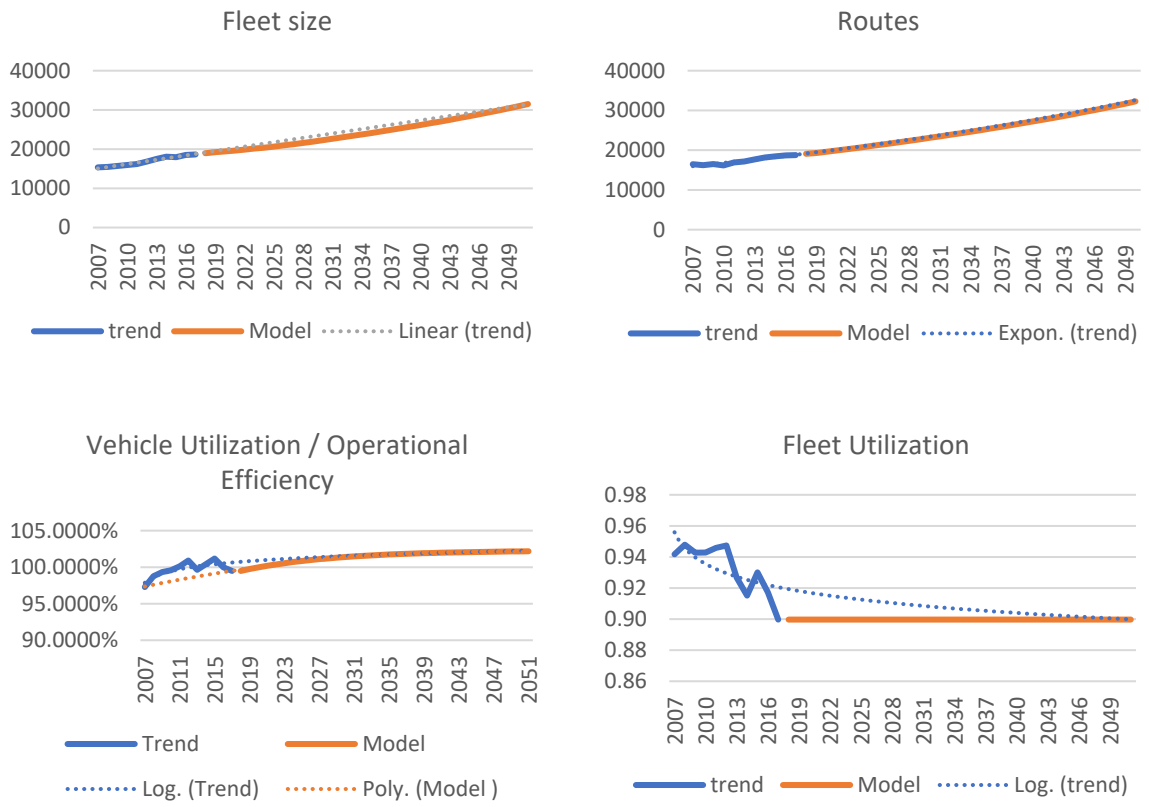


Figure 10: Replication of Historic trend

6.3.1.2 Historic trend and Current Trend – Comparison

The model closely replicated the historic indicators and following inferences were drawn out.

1. The fleet size projected by the tool and trend given for MSRTC was compared. The analysis showed (table 5) that following actual data- by 2051, MSRTC will attain 31492 bus fleet size

whereas the projection stated MSRTC will attain 31492 as fleet size strength by 2051. A linear trend has been followed to project the fleet size for MSRTC. Other type of trendlines were experimented. However, they give similar values.

Table 5: Historic trend V/s Current Trend – Fleet Strength

Year	2007	2010	2015	2016	2017	2018	2020	2030	2040	2051
Model Projected	15355	15947	17957	18514	18635	18594	19416	22273	26156	31492
Actual Trend	15352	15950	17957	18514	18634	18599	19525	23770	27232	31492

2. Route data provided by MSRTC was also compared with route projections based on MSRTC trend. The trend comparison is presented in Figure 11 and the values are listed in Table 6. The comparison revealed a similar trend in the routes projected from MSRTC past trend model results. A linear trend when projected for the number of routes suggests that MSRTC will have to increase the number of routes from 16487 in 2007 to 32868 in 2051. Whereas the given trend suggests that number of routes should be increased to 32872 by 2051. Both the figures lie in very close proximity.

Table 6: Historic trend V/s Current Trend – Routes

Year	2007	2010	2015	2016	2017	2018	2020	2030	2040	2051
Model	16487	16130	18451	18707	18766	19093	19607	23100	27209	32868
Trend	16482	16170	18450	18706	18765	19093	19607	23102	27218	32872

3. Vehicle utilization based on the projection and the actual data provided was compared. The trend comparison is presented in Figure 11 and the numbers are listed in Table 7. Although, vehicle utilization has gone through sudden fluctuations from 2007 to 2017, the trend and the projections are expected to achieve a similar value of around 99% towards the horizon year. It is also important to note that Vehicle utilization shows an increasing trend. In both, actual and projected trend, vehicle utilization is expected to increase to approximately 99% by 2051.

Table 7: Historic trend V/s Current Trend – Vehicle utilization

Year	2007	2010	2015	2016	2017	2018	2020	2030	2040	2051
Model Projected (in %)	97	98	99	99	99	99.49	99.97	101.39	101.95	102.17
Actual+ Trend (in %)	97	100	101	100	99	100	100	101.67	101.95	102.17

4. Fleet estimation tool outputs can be used to estimate fleet utilization of MSRTC. The trend comparison is presented in Figure 11 and the numbers are listed in Table 8. Whereas, fleet

utilization shows a rapidly decreasing trend. In both, actual and projected scenario, fleet utilization is expected to drop to a constant of 90% by 2051.

Table 8: Historic trend V/s Current Trend – Fleet Utilization

Year	2007	2010	2015	2016	2017	2018	2020	2030	2040	2051
Model Projected	0.95	0.93	0.93	0.90	0.85	0.90	0.90	0.90	0.90	0.90
Actual+ Trend	0.94	0.94	0.93	0.92	0.90	0.92	0.91	0.90	0.90	0.90

6.3.1.3 Development of Business as usual scenario

As mentioned earlier, 10-year historic data from STU was collected and used to generate future trends (forecasting). This trend was used to derive default values such as target mode share and growth rates, etc. Additionally, insights from interactions with MSRTC officials were applied to generate a guestimate of mode share in horizon year between different trip types. For instance, the model has computed that in the current scenario, the intercity mode share of MSRTC buses is around 18.68%. However, it is expected to increase to 21.97% by 2051. These set default values when used with Maharashtra and MSRTC base data from 2017, generated output in a business as usual scenario. It is important to note that the target mode share mentioned is not necessarily achieved by 2050 (the horizon year of projection). It indicates the minimum/maximum mode share, the actual mode share in 2050, is estimated basis an input rate of change (in the default values tab) and may be much higher/lower than the target input. Critical default value inputs generated from trends developed using historic data have been listed in table 9. All input values in the dashboard and those included under the default values tab (for this scenario) have been listed in Annexure 10.6 and Annexure 10.7.

Table 9: Default Targeted Values (Scenario -1)

Target Values (Defaults)- Current Scenario	Percentage
Achievable target mode share (Intra City Trips) - IPT for less than 10km trip length	5.61%
Achievable target mode share (Intra City Trips) - STU Bus for less than 10km trip length	0.00%
Achievable target mode share (Intra City Trips) - Other Bus for less than 10km trip length	16.19%
Achievable target mode share (Intra City Trips) - IPT for more than 10km trip length	25.58%
Achievable target mode share (Intra City Trips) - MSRTC Bus for More than 10km trip length	0.00%
Achievable target mode share (Intra City Trips) - Other Bus for More than 10km trip length	24.59%
Achievable target mode share (Inter City Trips) - IPT for less than 10km trip length	0.00%
Achievable target mode share (Inter City Trips) - STU Bus for less than 10km trip length	28.89%

Achievable target mode share (Inter City Trips) - Other Bus for less than 10km trip length	0.00%
Achievable target mode share (Inter City Trips) - IPT for More than 10km trip length	2.71%
Achievable target mode share (Inter City Trips) - STU Bus for More than 10km trip length	64.63%
Achievable target mode share (Inter City Trips) - Other Bus for More than 10km trip length	2.26%
Targeted %Load factor	70.00%
Targeted Fleet utilization	90%
Operational Efficiency	102%
Staff ratio	6.24

6.3.1.4 Output

The tool projections revealed that by 2051, in a business as usual scenario, MSRTC fleet strength will almost be double of the present fleet size and vehicle utilization will increase by a total of 3.17%. Whereas fleet utilization is constant at a rate of 90%. Due to this, the overall mode share is expected to increase. The critical base values (generated through trend analysis) using which MSRTC requirements have been projected for Scenario 1 have been listed in table 10.

Table 10: Scenario 1 – Critical base values

S.No	Business as Usual Scenario	2018	2030	2051
1	Fleet Utilization -intracity	90%	90%	90%
	Fleet utilization-intercity	90%	90%	90%
2	Vehicle utilization-intracity	99%	101.4%	102.2%
	Vehicle Utilization-Intercity	99%	100.2%	102.2%
3	Trips Catered per Day (total)	3.52 Cr	3.99 Cr	5.09 Cr
4	%Load factor– Intercity	70%	70%	70%
5	%Load factor – Intracity	70%	70%	70%
6	Staff Ratio (overall)	6.24	6.24	6.24

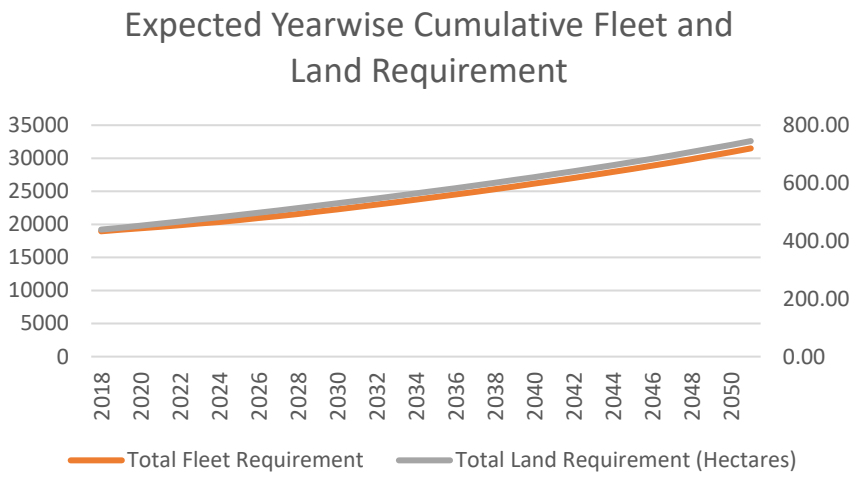
Table 11 presents the details of projected requirements for MSRTC up to 2051, under the 'business as usual' scenario. The detailed outputs for this scenario have been included in Annexure 10.8.1under section 10.8

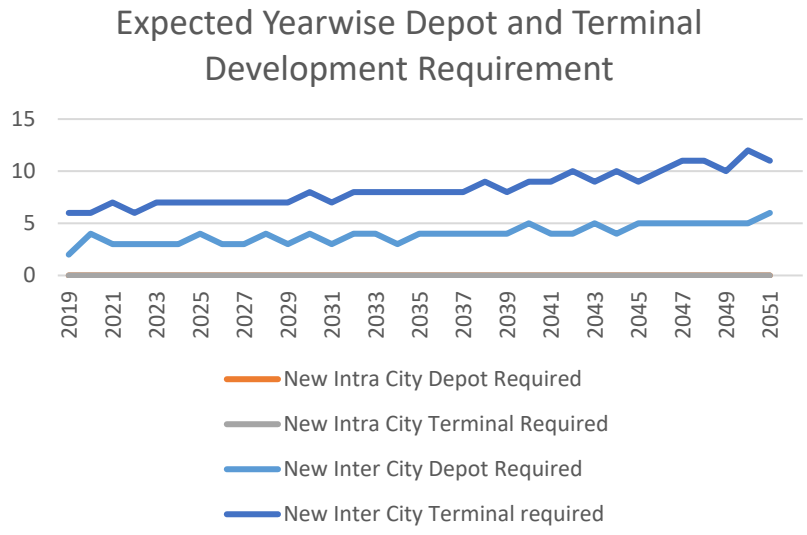
Table 11: Scenario 1 Outputs

S.no	Outputs – Business as Usual	2018	2020	2030	2040	2051
1	**Total Trips per day (MSRTC)**	3.52 Cr	3.60 Cr	3.99 Cr	4.45 Cr	5.09 Cr
2	**Total Routes**	19006	19597	23100	27209	32868

3	**Total Fleet**	18954	19416	22273	26156	31492
a	*Total Buses to be Procured in year*	318	3527	602	1087	1641
b	*Total Buses to be Scrapped in year*	0	3219	253	667	1087
4	**Number of terminals to be developed annually**	6	6	8	9	11
a	*Total Bus Terminal in year*	386	398	468	549	661
5	**Number of Depots to be developed annually**	3	4	4	5	6
a	*Total Bus Depot in year*	184	190	223	262	315
6	**Annual Land to be developed in Hectares**	7.42	7.19	8.27	9.83	12.92
7	**Annual Budget in Crores**	122	890	196	276	413
8	**Annual Staff requirement**	1983	1921	2209	2625	3452

The graphical representation of critical outputs for Scenario 1, as generated by the tool are presented in the Figure 11. This includes year-wise budgetary requirement for the fleet and infrastructure, expected year-wise number of new terminal and depots required by MSRTC, cumulative fleet and land requirement and projected numbers of routes.





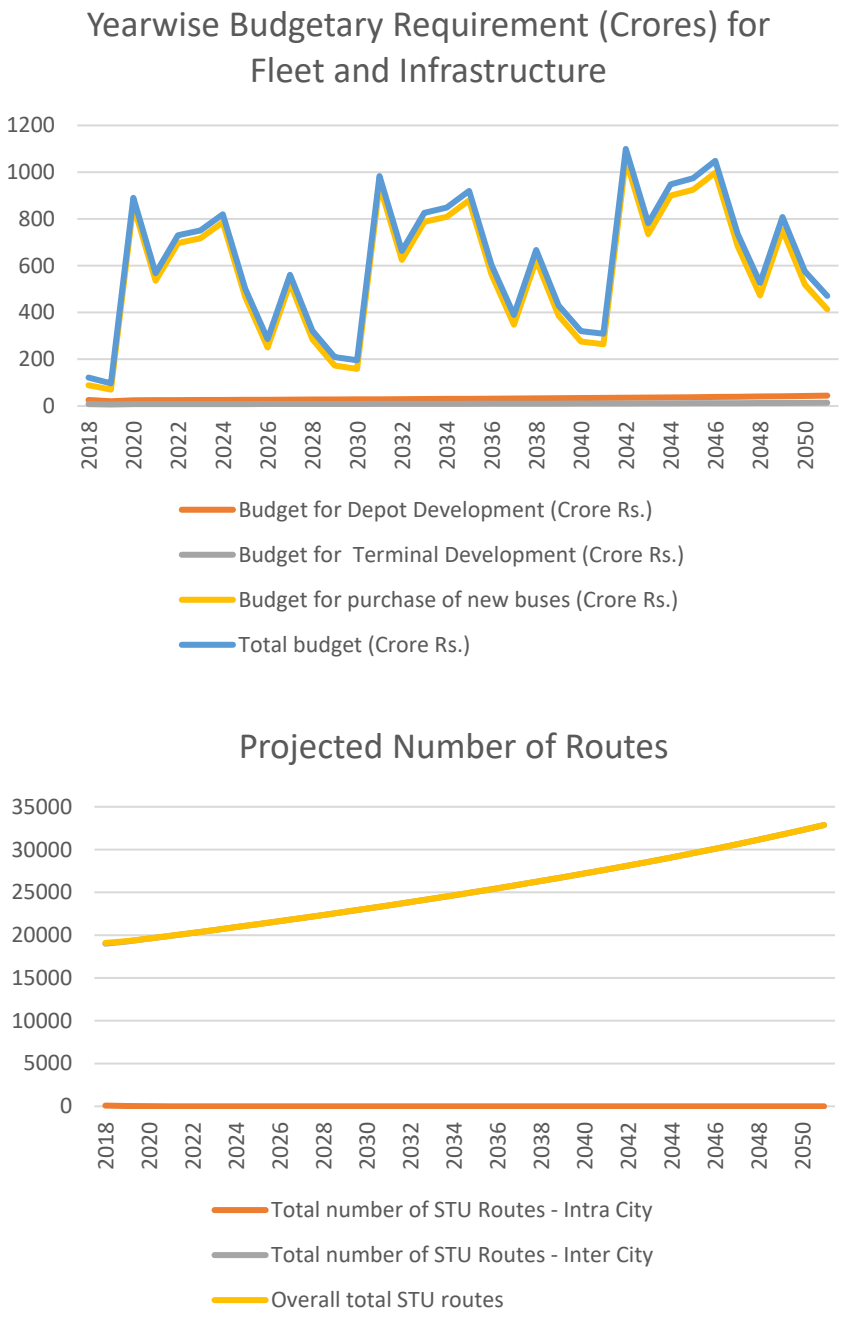


Figure 11: Graphical representation of critical outputs in scenario 1

Year wise budgetary requirement shows an overall increasing trend for budget requirement to develop infrastructure. However budgetary requirement for fleet – though increasing overall due to increase in fleet requirement, shows annual variations because of cyclic requirement of increased fleet purchase to replace scrapped buses. The land requirements to develop infrastructure increases gradually accordingly with increasing fleet size. However, number of depots and terminals required to be developed every year shows variations as these are developed in quantum (for a set number of buses). Overall routes projection shows an increasing trend in addition of new routes. However, Intercity routes shows an increasing trend.

6.4 Scenario 2- Mode share retain scenario

This model projects the fleet, budgetary, staffing, operational and infrastructural requirements for MSRTC, based on a scenario where the current MSRTC mode share remains constant up to 2050. Current mode share derived from MSRTC and census data, was input as target mode share in the default values tab. These have been listed in table 12. All input values in the dashboard and those included under the default values tab (for this scenario) have been listed in Annexure 10.6.2 section 10.6 and Annexure 10.7.2 section10.7 .

Table 12: Target Mode Share (Scenario 2)

Target Mode share (Defaults)	Percentage
Achievable target mode share (Intra City Trips) - IPT for less than 10km trip length	5.61%
Achievable target mode share (Intra City Trips) - STU Bus for less than 10km trip length	0.00%
Achievable target mode share (Intra City Trips) - Other Bus for less than 10km trip length	16.19%
Achievable target mode share (Intra City Trips) - IPT for more than 10km trip length	25.58%
Achievable target mode share (Intra City Trips) - MSRTC Bus for More than 10km trip length	0.00%
Achievable target mode share (Intra City Trips) - Other Bus for More than 10km trip length	24.59%
Achievable target mode share (Inter City Trips) - IPT for less than 10km trip length	9.28%
Achievable target mode share (Inter City Trips) - STU Bus for less than 10km trip length	14.39%
Achievable target mode share (Inter City Trips) - Other Bus for less than 10km trip length	2.84%
Achievable target mode share (Inter City Trips) - IPT for More than 10km trip length	11.63%
Achievable target mode share (Inter City Trips) - STU Bus for More than 10km trip length	24.13%
Achievable target mode share (Inter City Trips) - Other Bus for More than 10km trip length	29.76%
Targeted %Load factor	70%
Targeted Fleet utilization	90%
Operational Efficiency	102%
Staff ratio	6.24

6.4.1.1 Output

It was observed that projections up to 2051 in scenario 2 generated similar results/requirements (for MSRTC) as in scenario 1 i.e. business as usual scenario (Table 11). The tool projections revealed that by 2051 MSRTC fleet strength will need to be increased by almost 30%- with an increasing vehicle

utilization (as per current trend), to maintain the current mode share (for each trip type). The critical base values (generated through trend analysis) using which MSRTC requirements have been projected for Scenario 2 have been listed in Table 13

Table 13: Scenario 2 - Critical base values

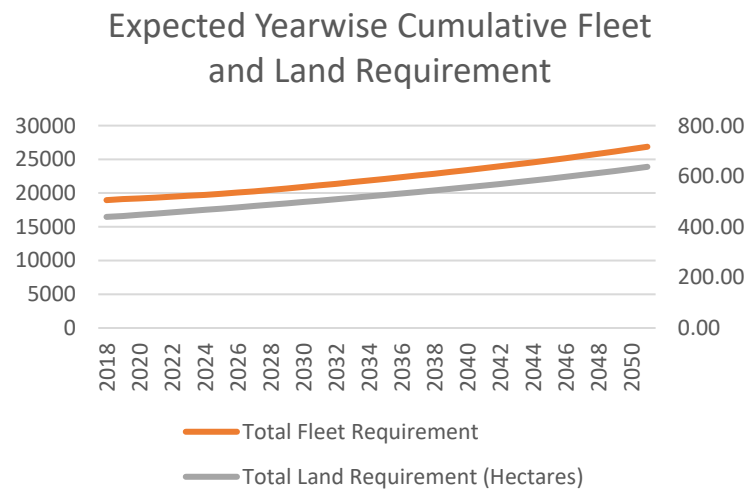
S.No	Mode Share Retained as per MSRTC trend	2018	2030	2051
1	Fleet Utilization- intracity	90%	90%	90%
	Fleet Utilization- intercity	90%	90%	90%
2	Vehicle utilization-intracity	99%	101.4%	102.2%
	Vehicle Utilization- intercity	99%	101.4%	102.2%
3	Trips Catered per Day (total)	3.52 Cr	3.99 Cr	5.09 Cr
4	%Load factor – Intercity	70 %	70%	70%
5	%Load factor – Intracity	70%	70%	70%
6	Staff Ratio (overall)	6.24	6.24	6.24

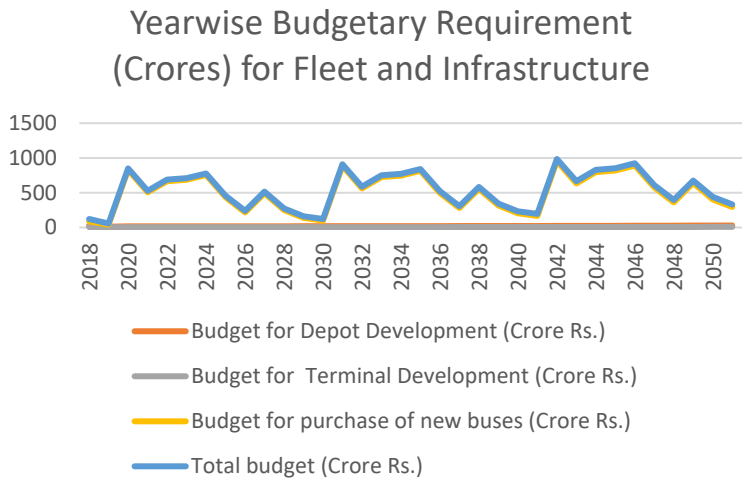
Table 14 presents the critical elements of output generated by the tool in a mode share retain scenario. The detailed outputs for this scenario have been included in Annexure 10.8.2 section 10.8

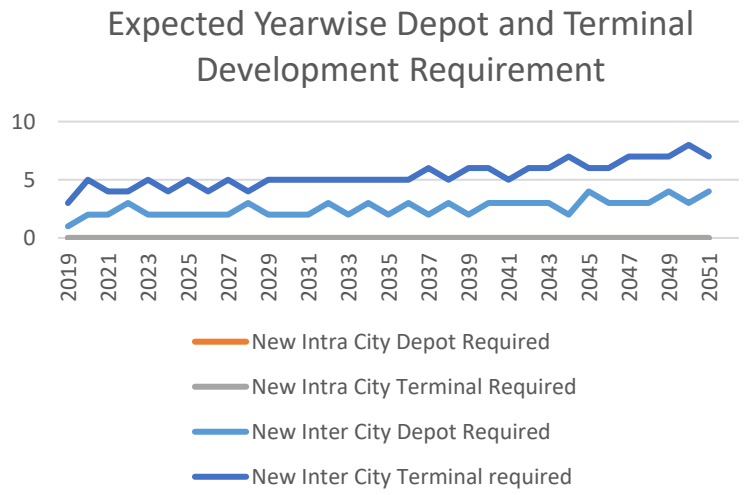
Table 14: Scenario 2 Outputs

S.no	Outputs – Mode share Retained (asper MSRTC past trend)	2018	2020	2030	2040	2051
1	**Total Trips per day (MSRTC)**	3.52 Cr	3.60 Cr	3.99 Cr	4.45 Cr	5.09 Cr
2	**Total Routes**	19006	19382	21683	24348	28039
3	**Total Fleet**	18954	19208	20907	23406	26866
a	*Total Buses to be Procured in year*	318	3422	378	814	1177
b	*Total Buses to be Scrapped in year*	0	3219	149	544	814
4	**Number of Terminals to be developed annually**	6	5	5	6	7
a	*Total Bus Terminal in year*	386	394	439	492	564
5	**Number of depots to be developed annually**	3	2	2	3	4
a	*Total Bus Depot in year*	184	187	209	234	269
6	**Annual Land to be developed in Hectares**	7.42	4.74	5.34	6.32	8.46
7	**Annual Budget in Crores**	122	850	123	233	333
8	**Annual Staff requirement**	1983	1266	1428	1689	2261

The graphical representation of critical outputs for Scenario 2, as generated by the tool are presented in Figure 12. These include year-wise budgetary requirement for the fleet and infrastructure development, expected year-wise number of new terminal and depots required by MSRTC, cumulative fleet and land requirement and projected cumulative number of routes.


Expected Yearwise Cumulative Fleet and Land Requirement
30000
25000
20000
15000
10000
5000
0
800.00
600.00
400.00
200.00
0.00
2018 2020 2022 2024 2026 2028 2030 2032 2034 2036 2038 2040 2042 2044 2046 2048 2050
Total Fleet Requirement
Total Land Requirement (Hectares)


Yearwise Budgetary Requirement (Crores) for Fleet and Infrastructure
1500
1000
500
0
2018 2020 2022 2024 2026 2028 2030 2032 2034 2036 2038 2040 2042 2044 2046 2048 2050
Budget for Depot Development (Crore Rs.)
Budget for Terminal Development (Crore Rs.)
Budget for purchase of new buses (Crore Rs.)
Total budget (Crore Rs.)


Expected Yearwise Depot and Terminal Development Requirement
10
5
0
2019 2021 2023 2025 2027 2029 2031 2033 2035 2037 2039 2041 2043 2045 2047 2049 2051
New Intra City Depot Required
New Intra City Terminal Required
New Inter City Depot Required
New Inter City Terminal required

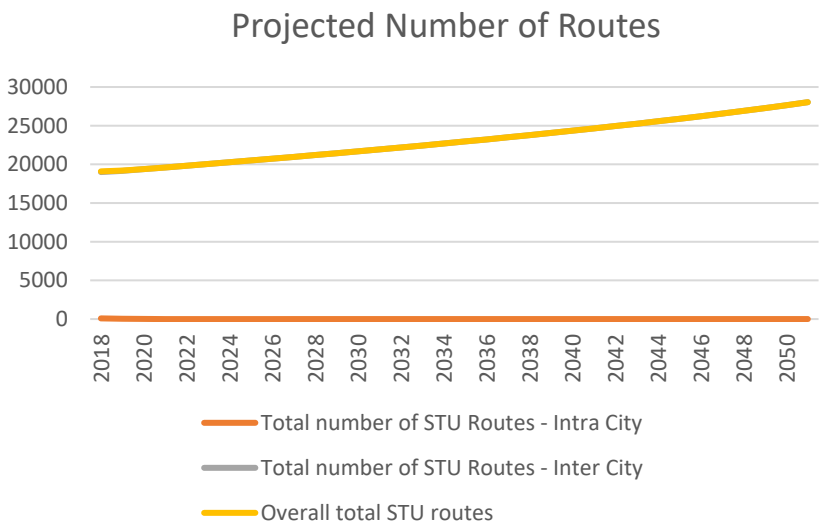


Figure 12: Graphical representation of critical outputs in scenario 2

6.5 Scenario 3 – Desirable Scenario

This model projects the fleet, budgetary, staffing, operational and infrastructural requirements for MSRTC, based on a scenario where the desirable inputs have been obtained from MSRTC. The desirable inputs for different values such as fleet utilization, vehicle utilization, %load factor etc. were discussed with MSRTC officials and a mode share along with other outputs was derived from the same. All input values in the dashboard and those included under the default values tab (for this scenario) have been listed in Annexure10.6.3 section10.6 and Annexure10.7.3 section10.7 .

Table 15: Target Mode Share (Scenario 3)

Target Mode share (Defaults)	Percentage
Achievable target mode share (Intra City Trips) - IPT for less than 10km trip length	5.61%
Achievable target mode share (Intra City Trips) - STU Bus for less than 10km trip length	0.00%
Achievable target mode share (Intra City Trips) - Other Bus for less than 10km trip length	16.19%
Achievable target mode share (Intra City Trips) - IPT for more than 10km trip length	25.58%
Achievable target mode share (Intra City Trips) - MSRTC Bus for More than 10km trip length	0.00%
Achievable target mode share (Intra City Trips) - Other Bus for More than 10km trip length	24.59%
Achievable target mode share (Inter City Trips) - IPT for less than 10km trip length	0.00%
Achievable target mode share (Inter City Trips) - STU Bus for less than 10km trip length	28.89%
Achievable target mode share (Inter City Trips) - Other Bus for less than 10km trip length	0.00%
Achievable target mode share (Inter City Trips) - IPT for More than 10km trip length	2.71%

Achievable target mode share (Inter City Trips) - STU Bus for More than 10km trip length	64.63%
Achievable target mode share (Inter City Trips) - Other Bus for More than 10km trip length	2.26%
Targeted %load factor	74%
Targeted Fleet utilization	95%
Operational Efficiency	100%
Staff ratio	6

6.5.1.1 Output

It was observed that projections up to 2051 in scenario 3 generated similar results/requirements (for MSRTC) as in scenario 1 i.e. business as usual scenario (table 11). However, the tool projects that by 2051 MSRTC fleet strength will increase only by around 3000 buses in a desirable scenario. However, it is only possible if 100% vehicle utilization is achieved by 2051, while %load factor follows an increasing trend and reaches a value of 72% and fleet utilization is maintained at a constant rate of 95%. The critical base values (generated through trend analysis) using which MSRTC requirements have been projected for Scenario 3 have been listed in Table 16

Table 16: Scenario 3 - Critical base values

S.No	Mode Share Retained as per MSRTC trend	2018	2030	2051
1	Fleet Utilization- intracity	90%	92%	95%
	Fleet Utilization- intercity	90%	92%	95%
2	Vehicle utilization-intracity	99%	99.6%	100%
	Vehicle Utilization- intercity	99%	99.6%	100%
3	Trips Catered per Day (total)	3.52 Cr	3.99 Cr	5.09 Cr
4	%Load factor – Intercity	70.1 %	71.12%	72.31%
5	%Load factor – Intracity	70.1%	71.12%	72.31%
6	Staff Ratio (overall)	6	6	6

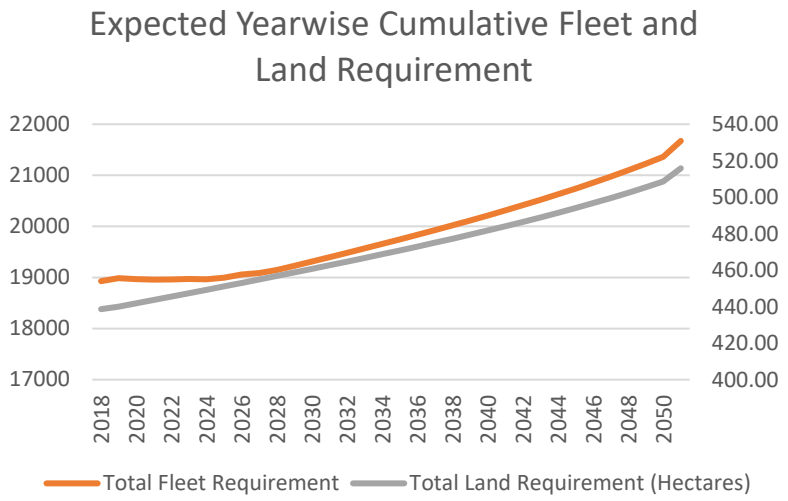
Table 17 presents the critical elements of output generated by the tool in a desirable scenario. The detailed outputs for this scenario have been included in Annexure10.8.3 section10.8

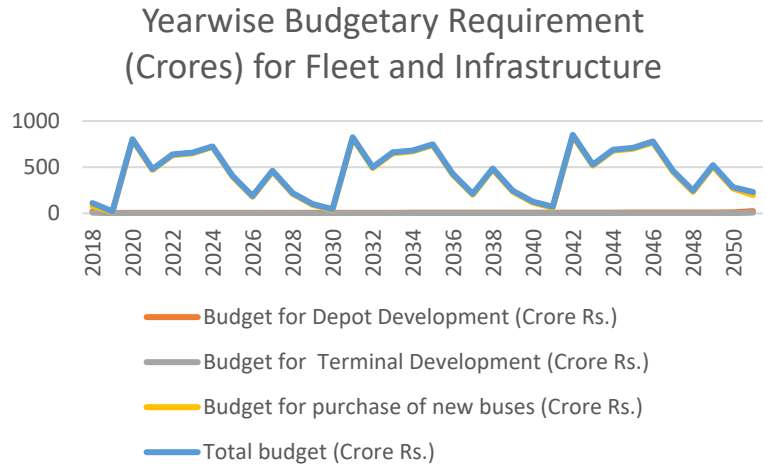
Table 17: Scenario 3 Outputs

S.no	Outputs – Mode share Retained (asper MSRTC past trend)	2018	2020	2030	2040	2051
1	**Total Trips per day (MSRTC)**	3.52 Cr	3.60 Cr	3.99 Cr	4.45 Cr	5.09 Cr
2	**Total Routes**	18847	18951	19418	19721	20255
3	**Total Fleet**	18928	19179	20500	22258	24604
a	*Total Buses to be Procured in year*	292	3403	340	647	1059

b	*Total Buses to be Scrapped in year*	0	3219	165	468	647
4	**Number of Terminals to be developed annually**	6	4	4	3	9
a	*Total Bus Terminal in year*	386	393	431	467	517
5	**Number of depots to be developed annually**	3	2	2	2	4
a	*Total Bus Depot in year*	184	187	205	223	246
6	**Annual Land to be developed in Hectares**	6.82	4.30	4.09	4.18	9.62
7	**Annual Budget in Crores**	112	843	106	180	312
8	**Annual Staff requirement**	1381	777	925	1025	2456

The graphical representation of critical outputs for Scenario 3, as generated by the tool are presented in Figure 13. These include year-wise budgetary requirement for the fleet and infrastructure development, expected year-wise number of new terminal and depots required by MSRTC, cumulative fleet and land requirement and projected cumulative number of routes.





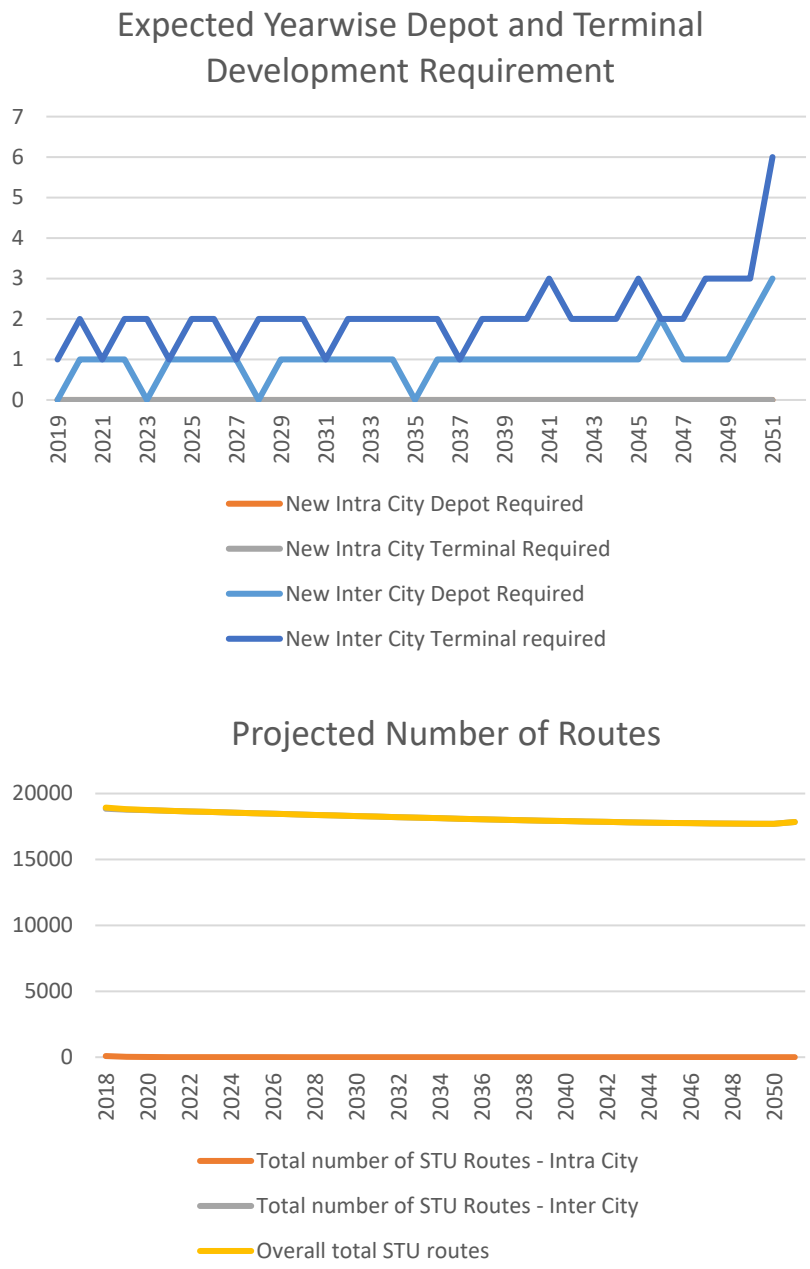


Figure 13: Graphical representation of critical outputs in scenario 3

7 Profitability Factors in Desirable Scenario

The fleet estimation tool not only estimates the future fleet requirement but also aims to help the STU's in building profitability scenarios. The overall profit/loss and investment of the STU's are dependent on several rigid and flexible STU parameters. As part of the study, 5 broad parameters were identified which pivots the earning and cost incurred by STU's and thus affected the profitability. These factors have a significant impact on generating profits and reducing losses. These include-

1. Staff to bus ratio
2. Fleet utilization
3. Avg. Occupancy
4. Average passenger trip length
5. Operational efficiency

The strategies and action plan, to influence these and other factors that can affect the profitability of MSRTC, has been presented in the subsequent chapter.

In a desirable scenario, MSRTC is observed to encounter losses of Rs. 1527 crores in 2018, while the model projects that these losses are expected to decrease to Rs. 1522 crores by 2051. The fluctuation in losses as observed in Figure 14 is a result of variation in fleet purchasing requirements. This is because in the years when a significant fleet size reaches its age limit, additional funds are required to replace the same, thus increasing losses. Thus, the fluctuations in the graph are caused by fleet replacement requirement in that year. Thus, to minimize STU losses and to find the breakeven point, three of the selected parameters were tweaked to study the impact on the profitability in the business as usual scenario. These are fleet utilization, staff to bus ratio and %load factor.

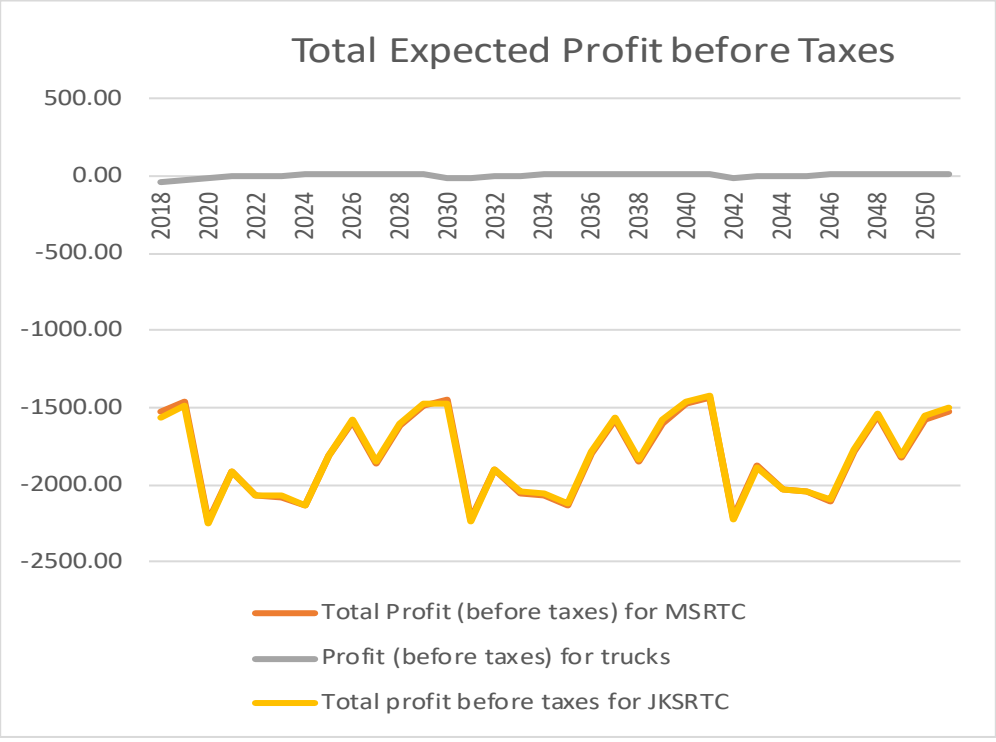


Figure 14: MSRTC's projected profit output asper Current trend

The fleet estimation tool provides users, flexibility to set the target values under default tab to generate the desired scenarios. Out of these, five factors, listed above (that are likely to affect

probability), passenger trip length and operational efficiency do not have a clear benchmark and thus have not been tweaked as a part of this study. The other three factors, i.e. fleet utilization, %load factor and staff to bus ratio can be altered for improvement. To get a systematic idea of improvement in loss, modification of the parameters was done in a chronological order. This order of modification was based on the maximum/minimum impact incurred on the STU's cost and earnings by changing the parameters. Thus, the order followed first increasing fleet utilization, then %load factor ratio followed by staff to bus ratio.

Firstly, the rate of change of fleet utilization is increased to a value of 0.2% from 0.15% in a desirable scenario. By doing this, fleet utilization follows an upward trend and achieves the value of 97% by 2051 while it reaches a value of 95% in a desirable scenario (Figure 15). Simultaneously, in this proposed scenario, the losses are reduced from 1522 crores in 2051 in a desirable scenario to 1249 crores. Causing an overall reduction in losses of around 20%.

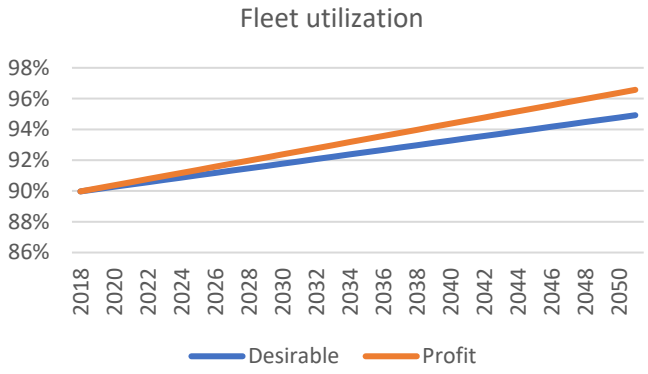


Figure 15: Fleet Utilization BAU vs Proposed

Secondly, %load factor was altered. According to MSRTC, a desirable value for occupancy will be around 72% by 2051. However, for achieving profits, increase in occupancy will be a good contributing factor (however policy, service planning and other interventions will be required to achieve the increased occupancy). The target occupancy was set to 83% with rate of change set as 2.5% in default values tab. This creates a scenario with gradual increase in occupancy from 70% to 78% in the horizon year 2051 (Figure 16). When this scenario is combined with the previous scenario i.e. fleet utilization, MSRTC is expected to reduce its losses to just 192 crores in the horizon year.

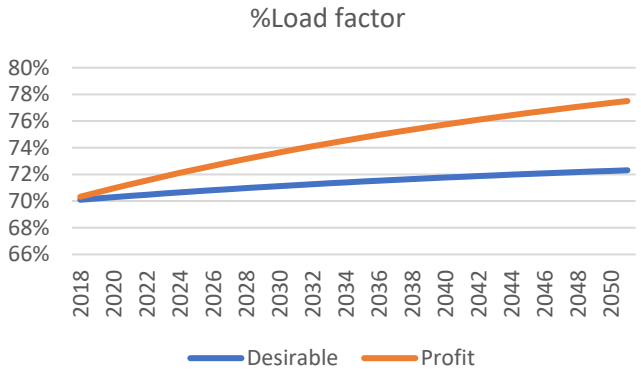


Figure 16: %Load factor BAU vs Proposed

In line with this, staff to bus ratio is changed from 6 to 5.2 (Figure 17). According to STU data provided, MSRTC wants to achieve a staff to bus ratio of 6. This implies 6 people per bus which is slightly higher than what is prescribed in literature for the subcontinent but significantly higher than what other countries can achieve. Following this, firstly the target bus staff ratio was reduced to 5.2 in the default tab of fleet estimation tool and the impact over profitability was noted. Combined with the previous two changes, the summative effect of these three changes causes MSRTC to achieve a profit of 398 crores in the horizon year.

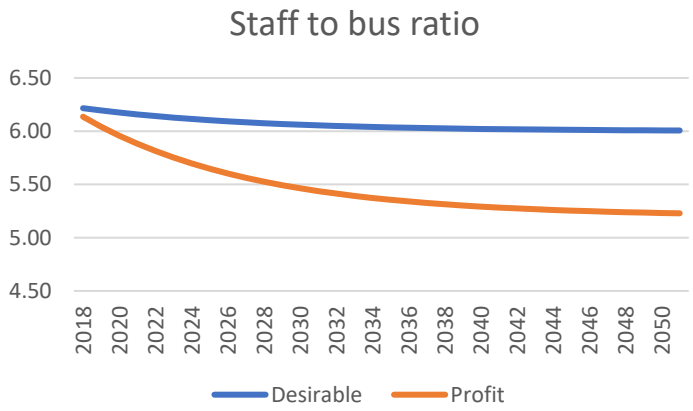


Figure 17: Staff to bus ratio BAU vs Proposed

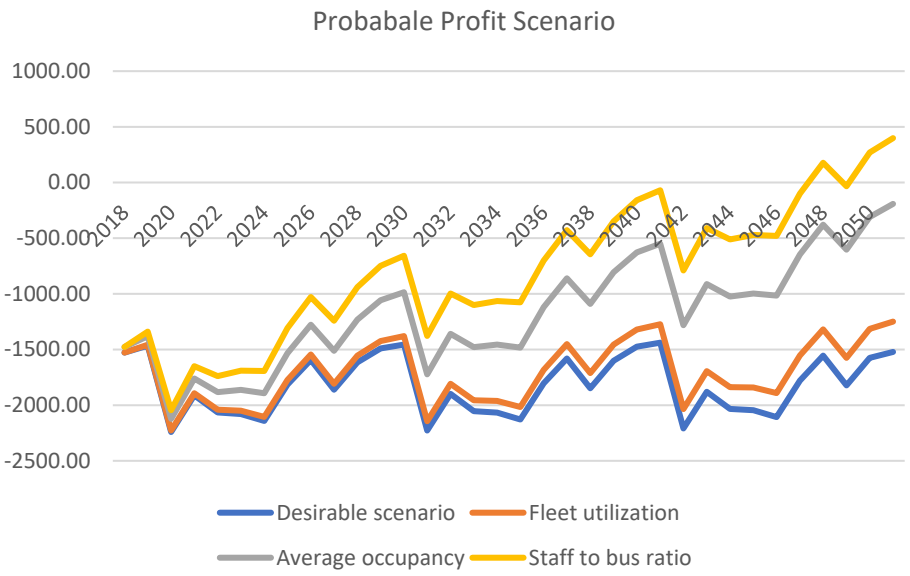


Figure 18: Probable profit scenario

Figure 18 shows the comparative stage-wise graphical representations of the profit output generated by the tool depicting the improvements in loss recovery after concurrently deploying the three scenarios discussed above (%load factor improvement scenario combines all- fleet utilization, %load factor and reduction in staff to bus ratio). The fluctuation in losses as observed in figure 19 is a result of variation in the fleer purchasing requirements. This is because in the years when a significant fleet size reaches its age limit, additional funds are required to replace the same, thus increasing losses. Thus, the dips in the graph are caused by fleet replacement requirements in that year.

7.1 Cost and Revenue Implications

After tweaking the profitability factors i.e., fleet utilization, % load factor and staff to bus ratio, it is observed that MSRTC will be able to gain an independent organisation status in future. This is shown in the graphs represented below (Figure 19, Figure 20, Figure 21 & Figure 22). Additionally, Figure 21 reveals that in a desirable scenario, MSRTC reaches a negligible state support and becomes self-sustainable based on the current value of money.

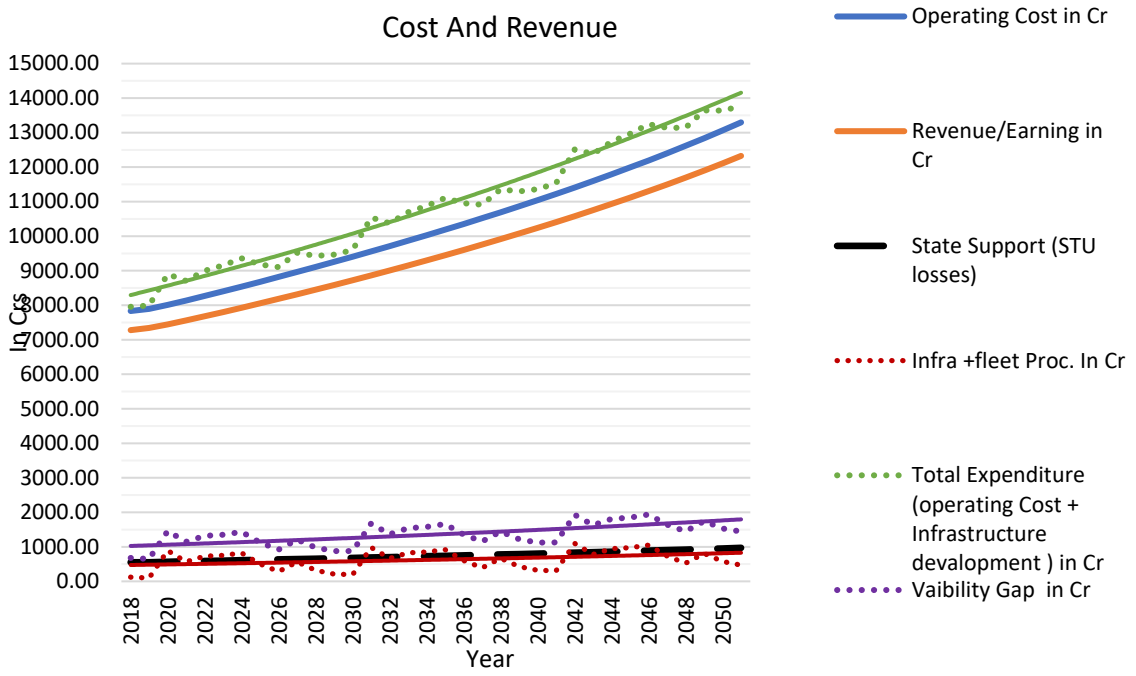


Figure 19: Business As usual scenario

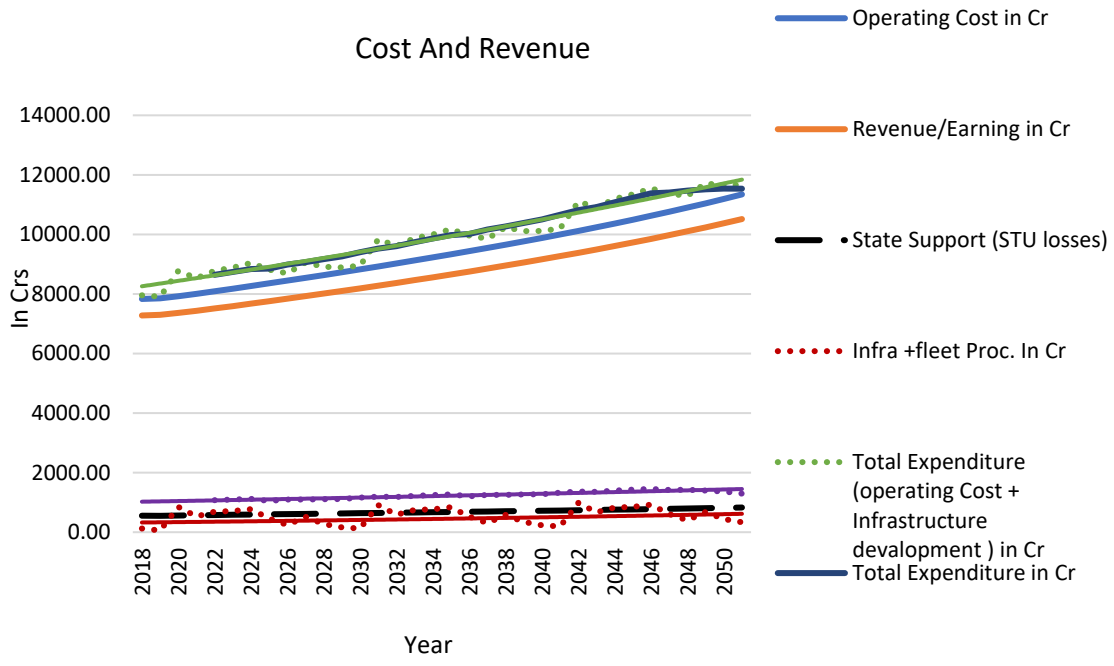


Figure 20: Mode share retain scenario

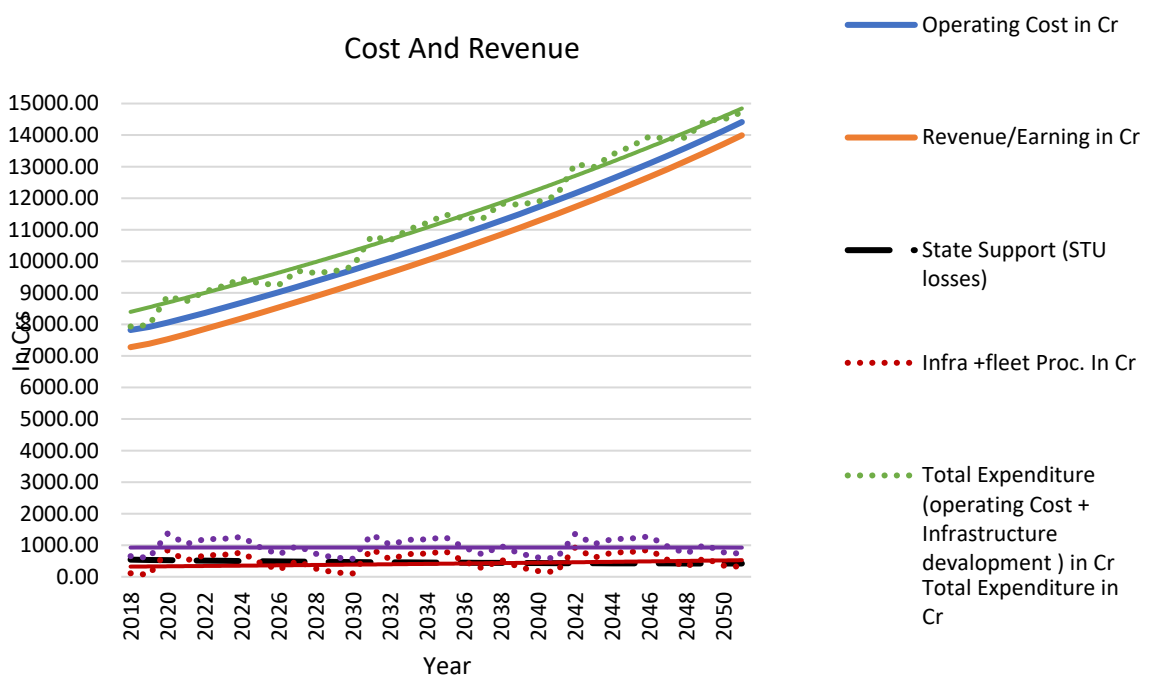


Figure 21: Desirable Scenario

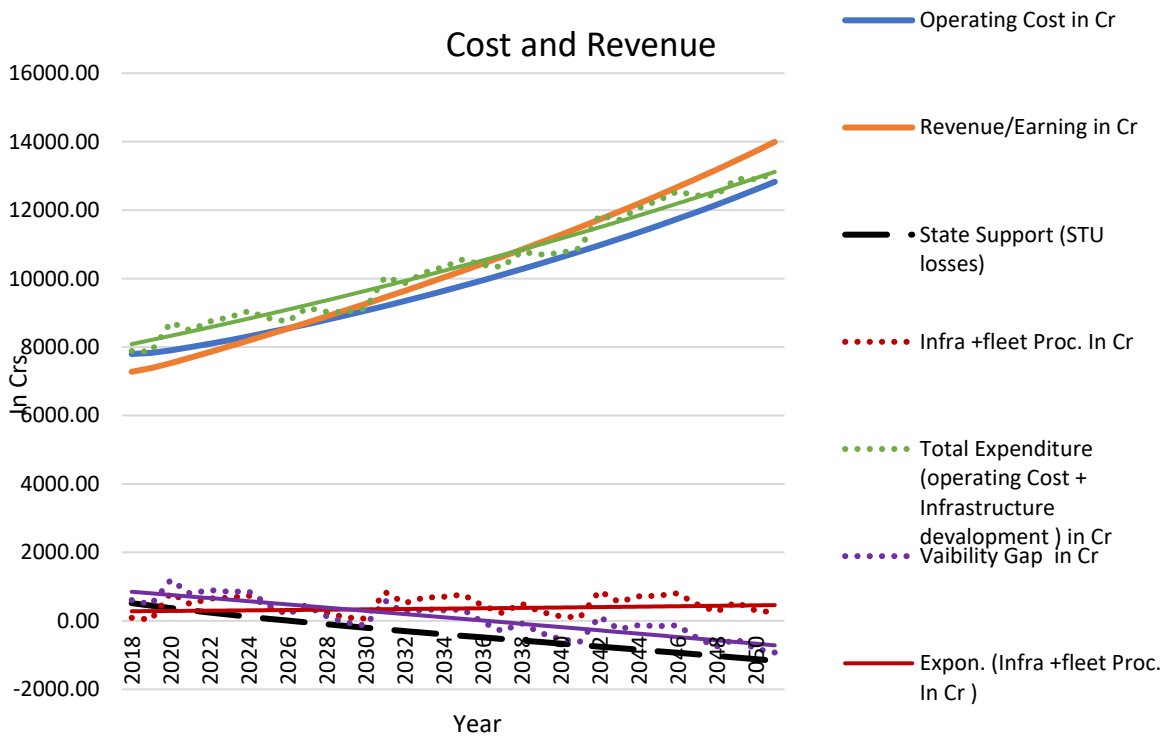


Figure 22: Profitability scenario

8 Strategies and Action Plan to Achieve Loss Reduction for MSRTC

This chapter focuses on the applicability of the loss reduction factors identified while developing long-range roadmap plan for MSRTC. The implication of these factors is been discussed and presented in the above chapters. The same was also presented to MSRTC officials held on 23rd July 2018 at MSRTC office, Mumbai (Annexure - 10.12). In this meeting MSRTC officials expressed the need to understand the strategies and action plan that can be applied to influence these factors. This section presents the various aspects for loss reduction, action plans and implementation of loss reduction techniques based on the comprehensive literature study, and suggestion received from various experts.

Majority of the buses are run by state transport undertakings (STUs) and most of these organizations are unprofitable. The combined net loss of STUs in 2015-16 was Rs 11,349 crore, 7.2% higher than in 2014-15 (Hindustan Times, 2017). However, there are signs that the STUs have initiated steps to improve efficiency and remain competitive in the evolving scenario – where both State and central governments are laying emphasis on strengthening public mobility in the country. Not only are we observing an increase in the number of STUs registering reduced losses but also an overall improvement in staff productivity, average occupancy ratio and overall vehicle productivity (Business-standard, 2016). For Example – Bengaluru metropolitan Transport corporation (BMTC) became one of the few public transport agencies to operate at a profit. It is evident from the outputs generated by the fleet estimation exercise (for different STUs, under this study), factors like fleet utilization, average and profitability of STU's. This section uses detailed literature review to highlights the possible strategies and approaches that may be adopted by the STU's for reducing annual losses and improving profitability. These have been presented below. Broad strategies for loss reduction have been identified from literature. Action plans based on these strategies lists detailed actionable points (include scope of each action) in terms of planning, financing and implementation of identified interventions. Based on the proposed action plan an expected outcome follows.

8.1 Strategies

The strategies identified for MSRTC loss reduction are based on review of literature, case studies and best practices. These are based on two broad approaches - improved optimization and improved patronage. These are explained in detail below.

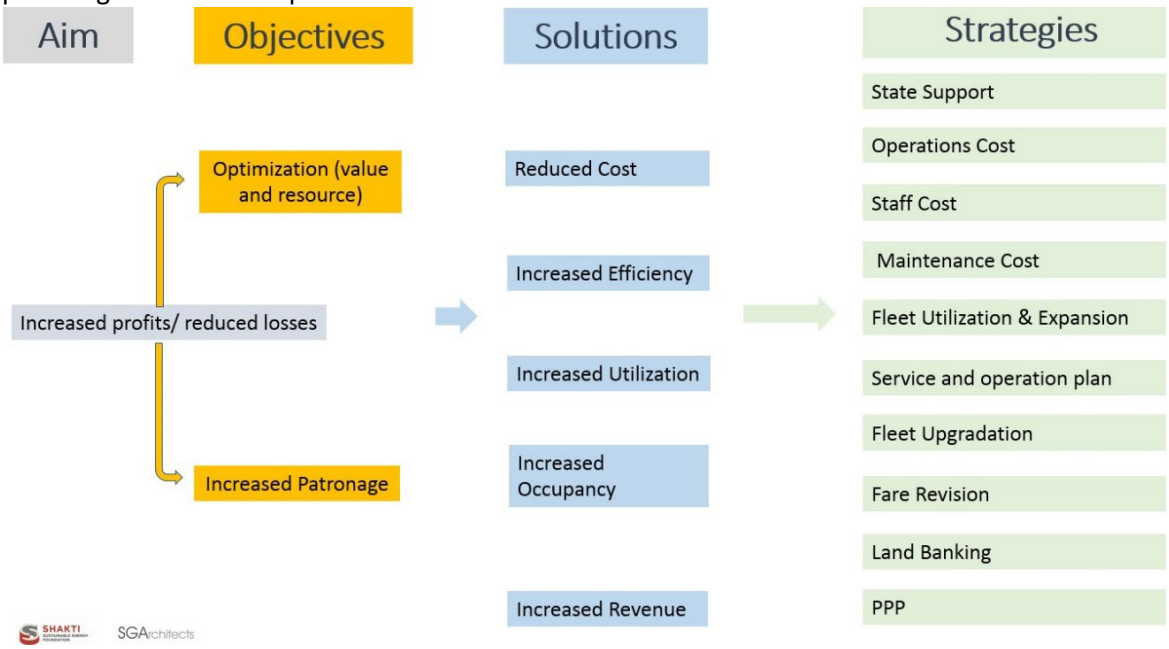


Figure 23: Graphical representation for strategies to achieve loss reduction or profitability for MSRTC

State Support in terms of Reduced Taxation.

Overall cost breakup for most STUs shows that interest on government loans constitutes the highest share of their expenses, followed by operational and staff costs (Anumita Roychowdhury, 2017). These loans present the balance sheet of the STUs in a bad light. State and City Governments regularly right off these loans, blaming the same on the STU and often labelling them unviable. However, it has been found that a significant factor in the losses of the STUs is the high tax rates that these bodies are subject to. There is no one-size-fits-all answer for road and transport taxes in India as tax rates vary highly by state. The implication of high taxation on STUs can be understood from the case of the Bangalore Metropolitan Transport Corporation (BMTC). In 2014-15, the operator reported a loss of INR 649 million, with a total tax liability of INR 3.096 billion from Motor Vehicle and fuel tax alone. The surplus BMTC would have declared in the absence of these taxes is INR 2.447 billion. Thus, every 1% reduction in these taxes translates to 6.99 extra buses the Corporation could have bought, improving bus frequencies and reducing overcrowding on its peak-hour services (Mukherjee, 2017).

A 2002 World Bank study confirms that, despite being a public transport service - the total tax burden per vehicle km is 2.6 times higher for public transport buses than cars in India. Buses have to pay tax according to the seating formula under the Central Motor Vehicle Act, which is 33 seated plus 20 standing. This is a major disadvantage. Bus agencies pay property tax, excise, customs, road tax, VAT, motor vehicle tax, and advertisement tax, among others. It is suggested that If such tax obligations are reduced and waived off, it will certainly help in improving the overall economic efficiency of the operators (Anumita Roychowdhury, 2017).

Taxing public buses at high rates, is in many ways, the low-hanging fruit for a government to increase fiscal revenue. From a commuter's point of view, however, taxes both contribute to higher fares and declining service quality – hardly an incentive to use the service. In the long run, this is likely to make the use of private vehicles more over public transport, resulting in both recurring losses for PT operators and increasing ills such as accidents and congestion, related to use of private modes. In the long-term deteriorating health of public transport companies or STU's results in unavailability of the only affordable

means of mobility to millions of people. Thus, it is imperative that to maintain public transport services in the country, high rate of taxes applied in STU's will need to be rationalized. This does not necessarily mean loss of fiscal revenue for the government. Reduction in per bus taxes allows a much-required expansion in the fleet size which substitutes reduced per bus fiscal revenue by increased tax base.

Maharashtra State Government extends annual financial support to MSRTC which is in the range of Rs. 500 crores. This support serves to offset the tax burden on the organization. However, the benefits of tax reduction which in turn gradually reduce the dependence on this State subsidy may be argued. Such an effort will correctly represent the financial health of the organization which in turn, may be useful to attract investments and raise loans (from financial institutions), and will put it on a path to financial independence from the State.

Reducing Operational Cost

The cost to STU for running the bus transport comes as fixed (infrastructure) and variable (operating) costs. Of the two, operating cost are the direct costs involved in the operation of vehicles, such as fuel, spare parts, labor, etc. and should have a direct influence on determining fare structure. Additionally, factors such as traffic volumes, weather conditions, geographical settings, and topographical features, also influences this direct cost. A broad operational cost breakup is presented in the

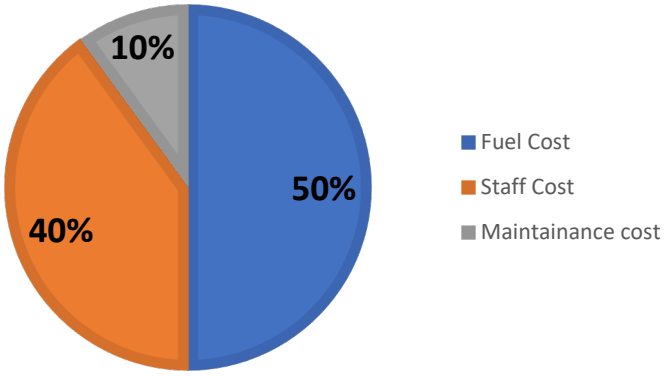


Figure 24: Breakup of operational cost for buses

Presently, STU's face an imbalance between operating costs and revenues generated through farebox and non-farebox methods (BUS KARO 2.0 - Case studies from India , 2014). Because, increase in fare has an adverse impact on both patronage and access to mobility, reduction in operational cost may be the only acceptable solution to address this imbalance. Many techniques to reduce the operational cost have been successfully applied by different STU's, which can serve as a source of learning for other STUs.

Fuel cost is one of the most significant components of bus operations. Fuel costs typically accounts for 35% to 50% of total operational cost for operators (Embarq-WRI ,India , 2014). The main reason for improvement in profitability by STU's such as Karnataka road transport corporation (KSRTC), is the vast improvement achieved in fuel efficiency of their buses. For example, the KSRTC's fuel efficiency has increased from 4.70 kilometers per liter of diesel in 1999-2000 to 5.28 km per liter by 2005 (The Hindu, 2005). But, questions remain on methods to choose for improving fuel efficiency. Due to the complexity of variables that impact fuel-efficiency, such as vehicle technology and fuel type, vehicle age, etc., it becomes difficult to set any benchmarks, and prescribe generalized solutions.

Findings of the literature review suggests better driver training and offering efficiency improvement linked incentives (to driver) help in promoting fuel efficiency. Better training not only improves the vehicle driving cycle, thereby improving its mileage, it also equips the vehicle crew with mannerism that will contribute to improved passenger comfort. KSRTC employees have been trained to be more courteous to the passengers thereby attracting better patronage, which helped them increase their farebox collection (BUS KARO 2.0 - Case studies from India , 2014). Revenue is a clear measure of passenger acceptance of the service; hence a fixed percentage of the revenue should be shared with drivers and conductors. This reduces the tendency to pilfer and improves efficiency as well customer service. For example, Andhra Pradesh State road Corporation - APSRTC, which was one of the largest operators in the world (before bifurcation of the state) is considered a pioneer for having successfully implemented an incentive scheme for its staff to improve fuel efficiency. The STU pays 4% incentives (2% for the driver and 2% for the conductor) for earnings beyond fare-box benchmark (Andhra Pradesh State Road Transport Corporation 2014) to ensure efficiency of drivers and conductors carry passengers from all designated pick up points. Additionally, cost savings acquired due to improved fuel efficiency can be shared with drivers and the mechanical staff, in pre-determined percentages. An indirect benefit is also expected in the form of discouraging the tendency to make unscheduled stops.
MSRTC is currently considering introduction of incentivization plan for bus crew, with an aim to reduce operational cost.

Reducing Staff cost

On an average, staff cost constitutes 40% of STU operational cost. Most STUs have more than 20% overhead (non-operational) staff (cleaners, security, (excess) administrative peons etc.) which add to the cost of operations without revenue improvement. This has resulted in high levels of redundancy with up to seven employees per bus on an average, leading to an increase in per vehicle km operational cost (World Bank , 2005). For some STUs, the high staff cost is due to state government salary and pension norms, which is beyond the control of STU. In many cases it is found, that government norms result in very high staff salaries, without adding much valuation in terms of productivity (Kearney, 2017). For example, senior vehicle crew salaries are very high, and this often has no or little relation to better performance. These inefficiencies also significantly contribute to loss accumulation. Yet other reason for high staff to bus ratio and thus high staff costs can be the deterioration of operational fleet without any correction of the staff required to manage/operate it. In November 2016, Delhi transport Corporation (DTC) had a staff of 28,816 to manage a fleet of 4,128 buses; but since only about 3,537 buses were usually on the road, the staff ratio was close to 6.98. One-third of DTC's total expenditure is on staff salaries. This enormous labor costs skew the balance sheet of these corporations (Anumita Roychowdhury, 2017).

Thus, a significant reduction in operational costs can be achieved by rationalizing the staff remuneration and numbers. Some studies suggest that the scope for reducing per km operational cost is greatest through possible reduction in staff earnings or remuneration (World Bank , 2005). This may not be a practice which is socially accepted or is agreeable by the employee's union, thus innovative improvements may be required in the human resource (HR) policies of the STU's. This can be achieved by comparing the HR policies, and breakup of costs between private and public operators. Some of the means of improving staff utilization without affecting their earning can be through redeployment of excess staff into other more suitable (suited to their experience and payoffs as per government norms) forms of employment, either within or outside the STU. Rationalizing staff deployment gradually reduces the need to hire additional staff for an expanding fleet, till the point of a desire equilibrium. This can be a step towards reducing the bus to staff ratio to recommended 5.2. This will also contribute to gradually optimizing individual staff costs based on value offered to the organization. Outsourcing of staff for functions like vehicle crew, maintenance, etc., can be another means of reducing undesirably high staff payoffs. However, these measures may also need to be weighed against any potential loss of social and economic well-being of the employees.

MSRTC is currently exploring means of rationalizing its staff to bus ratio, by improving efficiency and through outsourcing of activities. It is felt that a long-term plan linked to the service duration of current employees and the long-range fleet expansion plan, may be useful to MSRTC in achieving any annual targeted rationalization.

Reducing Maintenance Cost

Maintenance and repair are often overlooked as a possible source of savings by STU's. Lack of maintenance not only leads to low vehicle utilization, but reduced attractiveness and reliability, adversely affecting patronage from commuters. Many SRTUs don't effectively implement preventive maintenance strategies. This can be assessed from observed poor correlation of maintenance spend with vehicle productivity (Kearney, 2017). Improving maintenance effectiveness is a potential source for making financial savings. APSRTC is a clear example for this. APSRTC has been able to achieve 99.5% fleet availability by undertaking in-house vehicle maintenance through a vigorous system of checks and monitoring process, which engages multiple levels of management. Whereas in Assam STC, 39% of the fleet is non-operational, largely because of poor maintenance practice (Kearney, 2017). Also, the rate of cancellation of services for BMTC and KSRTC has been reduced from 6.2 per cent to 1 per cent. This is the result of improved maintenance of vehicles and better management of the crew.

Often for cost saving, STU's tend to indulge in to bad maintenance strategies which usually prove to be counterproductive in the long run. Often these strategies include letting buses run to the point of failure, using substandard parts and materials. Thus, it is recommended that the STU should employ

staff that have specialized knowledge achieved through constant training. STU should incorporate the use of sophisticated technology that involves detailed analysis of various aspects of the Vehicles. This shall help in detecting any possible flaw or inconsistency with regular patterns with an Immediate effect. STUs should also adopt stringent practices for daily inspections, weekly check-ups, monthly minor services, major services every quarter and a comprehensive annual service of the vehicles. Offloading maintenance activities, though outsourcing may also be considered by STUs. Considerations for this option (for part or complete maintenance activity) may be based on a detailed cost benefit analysis. A good service provider with right expertise/experience, may be able to trouble shoot problems early on, or provide more effective preventative measures, at a lower cost. The reduced cost and high expertise can be achieved by the outsourced organization through improved utilization of the workshop infrastructure and staff. This is generally achieved by servicing buses from different operators in multiple shifts. STUs may be limited by their organizational policies in exploring such innovative optimization techniques - which may only be achieved through outsourcing.

MSRTC has initiated an audit and improvement of its maintenance practices, with an aim to reduce operational cost and improve efficiency. It is expected that linking these strategies for improvement to fixed annual targets, will help in sustained benefits from these efforts.

Fleet Utilization and Expansion

The fleet strength, its substance and growth indicate how fast an organization is growing. This is an indicator of its efficiency. Maintenance or growth in share of passenger trips carried by a STU is only possible only through availability of adequate fleet strength. Increasing fleet strength requirements can be met through purchase of additional buses and by increasing the availability of existing fleet by increasing utilization. Fleet utilization indicates the share of revenue earning vehicles out of the total fleet. It reflects the efficiency of the maintenance department of the STU. The higher the figure of fleet utilization, the more efficient is the undertaking. This utilization is subject to the provision of adequate spares to meet foreseen contingencies (periodical maintenance) and unforeseen contingencies (vehicles breakdowns) etc.

The impact of limited fleet growth is reflected in the form of a falling trend of passengers carried and STU mode share - indicating that STUs have not been able to match the growth requirement of the public bus transportation system. Thus, to ensure patronage, it is essential for any STU to expand its fleet based on the current and expected demand. An expanding fleet not only ensures that potential passenger trips are captured, but it also attracts more trips by effectively increasing accessibility and reducing wait time. BMTC, one of the profitable STU doubled its ridership from 2.5 million to 5 million passengers, with a fleet expansion from 3,500 to 6,500 in the last decade. The fleet expansion was based on a long-term strategy and vision with a planning horizon of around 10 years helped the agency to predict the transport requirements in conjunction with the expansion of the city and expected increase in passenger trips.

MSRTC has been undertaking annual fleet expansion for many years now. The current rate of fleet expansion for MSRTC is more than the current rate of increase in trips in the State. This means that MSRTC will increase its mode share from current 18% to 22% by 2051, if it continues to expand at the same rate in the future. MSRTC has also achieved high rates of fleet utilization of 95%. It is striving to improve it further which is likely to contribute to increased mode share. However, it may be worth investigating the possibility of achieving higher mode share of 25 to 30%, and the long-range plan for an expanded fleet size to help attain this target.

Fleet Upgradation

Catering to the increasing transportation demand by only fleet expansion, in the absence of increased utilization, leads to increased inefficiencies and losses. Majority of the STU’s are unable to sustain a

planned growth due to mounting financial losses, largely caused by the continued use of over age bus fleet. Fleet utilization depends mainly on the availability of vehicles fit for traffic. This is because, even if fleet utilization is very high with an old fleet, vehicle utilization and occupancy ratio remain poor, leading to loss of revenue (Kearney, 2017). Older fleet has a poor utilization levels due to longer downtime required for maintenance activities. Moreover, it impacts vehicle productivity as older buses have higher breakdowns. Today, with income levels going up among many categories of passengers, there is a demand for improved services (even at a higher price). This is where private players have been able to capture a greater share from STUs, contributing to their losses. This signifies that STU's need fleet expansion with an upgraded fleet to sustain and face the competitiveness induced by the private agencies. This is the reason why KSRTC introduced more than 100 air-conditioned buses during the past year for long-distance travelers. In the case of BMTC, there is already a plan to introduce air-conditioned Volvo services on selected routes in Bangalore. These progressive corporations are also adopting new technologies to make their operations more efficient and remunerative (Embarq-WRI ,India , 2014).

To modernize its fleet, MSRTC is currently procuring 100 modern AC buses, equipped with PIS, GPS and other technologies. It may be useful for the organization to explore (through detailed cost benefit analysis), the possibility of inducting alternate fuel vehicles (apart from switching to Euro 6 diesel buses), such as hybrid fuel vehicles as well CNG and LPG buses.

Fare revision

There is a need for STU's to adopt a scientific approach to determine the fare structure by considering operational costs such as changes in fuel cost and inflation rates. This can be an effective way to maintain service quality and financial sustainability of the operator (Embarq-WRI ,India , 2014). For example - BMTC operates all public bus services in the city of Bangalore, and fares are based on a stage system, with a telescopic structure (BMTC 2014). In other words, fares increase as distances increase, with the cost per marginal unit of distance decreasing as the trip length increases. Each stage is approximately equal to 2 km, although they can be shorter on particular routes. BMTC operates several differentiated services, each with its own fare structure. The historical changes in BMTC fare rates (price per km) indicates that the price per km travelled of bus transport in Bangalore increased by about 75 percent in the past decade. During that period, BMTC fares changed 11 times, roughly once a year on average. With respect to fare setting, BMTC services may be categorized as follows: ordinary services (roughly 85 percent of all services) and other differentiated services (15 percent of all services). In both cases, BMTC utilizes a formula to determine the fare hike (per passenger km) to neutralize the burden of diesel price rise, and dearness allowance (DA) hike for STU employees. In other words, the formula is dependent on two factors, fuel prices and staff costs. BMTC conducts a review twice a year to determine whether a change in the fare structure is necessary. It is expected that as a public service STUs will need to maintain their fare to ensure affordability and access by public. Therefore, BMTC fare revision for ordinary services, state government approval is required. However, fare revision for other value added and premium services, has higher acceptance and often proves to be profitable. This can be used to cross subsidize any operational losses (caused by delay in fare revision) of ordinary services.

Currently MSRTC revises fare as per automated fare revision formula as per State Fare Revision Committee. This takes in to account and is based on increase in operational costs for the STU. However due to increased competition from private players, there may be need for the organization to take a re-look at the fare structure for long distance routes. For example, value-based fares and telescopic fare structures may need to be introduced.

Service and Operational plan

With the expansion of bus transport services, there is an increasingly strong need to allocate/plan space for bus infrastructure such as depots and terminals. Strategic distribution of infrastructure

spaces across the city, region or State, can significantly improve STU efficiency (Kearney, 2017). The service and operations based on a planned distribution and arrangement of the infrastructural assets of STU's will lead to improved efficiency and cost saving resulting in overall loss reduction. For example - to reduce dead mileage, Delhi Transport Corporation (DTC) has initiated the practice of re-fueling buses at depots closest to the terminating point and not necessarily at the mother depot (Bhasin 2011). Such efforts require a re-look at the operational and service plans. Software solutions for asset management, can be useful here. Additionally, they can help improve service consistency by predicting future demand, use data analytics to inform real time asset deployment and service plan modifications, monitor asset management and maintenance and highlight issues, etc. (World Bank , 2005). On similar lines, 38 depots and 50 bus terminals for BMTC were developed through a long-term land banking strategy (Bangalore Metropolitan Transport Corporation 2014). This aspect has been discussed in detail below.

MSRTC is actively exploring and expanding the use of computerization and integration of IT technologies in operations and administration, to achieve increased optimization and reduced costs of operations. Since such technologies are evolving at an ever-increasing rate, the organization may benefit from detailed planning of these technologies based on future readiness, cost effectiveness, expected benefits and ability for integration of different platforms.

Land banking

Normally, public transport corporations earn revenue from the sale of tickets and passenger passes which is known as traffic revenue (Anumita Roychowdhury, 2017). There is a revenue source other than traffic revenue which is known as the commercial revenue. Generation of this commercial revenue can certainly help STU's to minimize their recurring loss. In the recent times it has been realized by the STU's that the civil infrastructure and land holding with these agencies can be utilized in generating sustainable of commercial revenue. This can be achieved mainly by letting out the building space available with the public transport corporations. Not only this, the STU's also need to revamp its existing assets – terminals, depots and workshops instigated through better planning (Mukherjee, 2017). The current approach to plan bus infrastructure such as depot and terminal, has been focusing on fulfilling basic requirements such as docking bays for buses in terminals and parking space in depots. Most bus infrastructure are not planned for functional and space use efficiencies.

Better planning of Bus infrastructure, such as depots and terminals, has an important contribution in overall increase in patronage (due to improved passenger experience at the terminal) and improved vehicle utilization (due to improved maintenance facilities). Better planning also allows better utilization of space, allowing accommodation of more buses and/or passengers or releasing space for potential monetization.

For example, the Bangalore Development Control Regulations (Revised Master Plan 2015 - Bangalore Volume III 2007) specify transportation zones, which consider bus stands, bus shelters, and transport depots, etc. This gave birth to the innovative concept of Traffic and Transit Management Centers (TTMCs). Traffic Transit Management Centers are huge empty areas with a cumulative site area of 1,43,248 m^2 and parking for 2800 two wheelers and 3715 four wheelers. The space allowed people to park their two-wheelers and four-wheelers and switch to public transport for commuting. Apart from facilitating increased patronage from commuters, TTMCs have been a significant source of revenue to BMTC. The total expected revenue from these sites is more than 48 crore per annum. Thus, these centers helped BMTC compensate part of their losses. Using this concept, BMTC has decided to identify and leverage its land holdings in strategic locations throughout the city. This concept combines the development of passenger terminals, with the creation of commercial real estate space. This enabled BMTC to utilize rental revenue to cross-subsidize the construction and operational cost of the terminal and similar amenities (Embarq-WRI ,India , 2014). This model from Bangalore provides an example of how to leverage land holdings to solve the need to provide infrastructure for bus services and the need to generate non-fare box revenue. Innovative contracting options such as through the PPP mechanism can increase the viability of such projects.

MSRTC is currently exploring the development of 46 bus terminals on a BoT basis, where private parties will be invited to develop the terminal in exchange for a portion of developed land (which may be used for commercial purposes). Since MSRTC is expanding its fleet and operations, it may important to develop a long-term integrated land banking plan. This is because an understanding of fleet and land requirement for the organization over a 30 to 40-year period will provide for informed decision making, in terms of division and depot specific land bank available for monetization through the BoT or other routes (without impeding the growth of the STU).

Other PPP Strategies

Public private partnership (PPP) strategies can be used by STUs, to counter the competitive edge of private operators. For example, under the PPP model implemented by Assam State Transport Corporation (ASTC), private vehicle owners operate their vehicles under the ASTC brand. ASTC undertakes vehicle management including scheduling as well as dispatching, and allow vehicle owners to utilize its stations, where they are also provided support for ticket issuance. ASTC receives 10 percent of the gross income as commission, and 90 percent belongs to the owner. The program was initiated with 559 buses in 2001-02 and grew to 1,790 buses in 2005-06. During this period, the annual earnings increased from INR 2 crore to INR 14 crore (Embarq-WRI ,India , 2014). While this approach enabled ASTC to increase its revenue, it also helped in improving operational efficiency. Several ASTC properties, like their depots, terminals, interchanges, etc. are at prime locations. ASTC management has decided to commercially utilize them through re-development by integrating multi-level parking lots, cinemas, shops, hotels, petrol pumps, etc., at these locations. These initiatives have helped the agency to open an alternative revenue stream for cross-subsidizing operational and non-operation al costs. These efforts have allowed ASRTC to reduce their annual losses to Rs. 1.35 crore. ASTC has also explored additional methods to diversify from its core business of bus operations, with the intention to cross-subsidize any losses, and to achieve overall profitability (Embarq-WRI ,India , 2014). These included providing courier services, commercial operation of tire re-treading plants and a printing press.

8.2 Action Plan

For one or more of the above-mentioned strategies to be executed a planned approach from STU's, to seek alternate sources of revenue generation, for maintaining profitability and financial sustainability, is required. Review of literature reveals, that multiple STU's have successfully achieved, or demonstrate a clear potential for achieving loss reduction if the selected strategies, interventions and/or actions are initiated, through an integrated long-term action plan. This action plan has three main components – planning, funding and implementation.

The breakup and details of each of these components has been presented below.

8.2.1 Planning

The first step towards achieving and sustaining profitability for MSRTC, is planning of different strategies critical in achieving this objective. This planning phase also includes proposing budgetary requirements and action plan for implementation (of each). The studies to undertake this planning may be conducted in house or through a qualified consultant/expert. These studies (which may also need to be cross referenced with each other) shall include the following:

1. **Long range demand assessment and service planning –** STUs stand to benefit from long range, division and service specific planning for operations in both current and future scenario. Such long-range plans should have annual projections for the next 30 to 50 years. These plans can be developed through a mixed use of existing tools, or custom defined approaches. The key objectives to be achieved by such plans are as following:
    a. The plans shall be responsive to or build in parameters to account for expected changes in demography, infrastructure expansion (such as road network improvement), and other scenarios.
    b. The plans shall project service, division, origin-destination and trip length specific projection of demand in different scenarios. These scenarios shall be based on fare and developmental factors, apart from other parameters.
    c. Based on the demand estimates, the study should recommend (today and in future) potential routes (or origin-destinations to be served), estimate of fleet requirement for different services (such as AC, standard, luxury).
    d. This plan should also recommend for each division and depot/terminal in each division the required capacity for catering to traffic over the next 20 to 50-year period. Based on this it should be able to identify additional land requirement, or excess land available for other uses (for a defined time), at each depot and terminal site. This may include recommendation of new sites or shifting of existing sites with an aim to improve accessibility by passengers and improve operational efficiency (including reduction of dead miles).
    e. The plan shall recommend a desirable fare structure (for different services) from the passenger paying capacity, desire to pay and service valuation perspective. This shall be provided on annual basis for the study period (30 to 50 years).
    f. The division and service wise study findings shall conform to the aggregated MSRTC and/or State level projections. The aggregated findings shall be used to recommend revisions in current taxes on MSRTC. The study shall establish recommendations on tax rates in line with profit-loss estimates for the corporation in all defined scenarios (also accounting for potential technological and planning interventions to improve profitability), on an annual basis, over the study period (30 to 50 years). The recommendations shall be based on this understanding highlighting the optimal tax levels required for improving financial health of the Corporation without significantly denting the tax revenue earned by the state (possibly due to expansion of tax base).
    g. The plan shall define annual budgetary requirements for both fixed and variable costs, in all defined scenarios. This budgetary requirement shall be both division wise and aggregated for the Corporation, based on the estimated fleet and infrastructure development, maintenance and operational requirements (in all defined scenario over the study time period).
    h. The long-range plan shall define annual achievable benefits in terms of profitability, optimization, increased patronage, etc. It shall also include an economic analysis of these identified benefits, along with a detailed cost benefit analysis (accounting for the budgetary requirements to achieve the benefits).

i. The plan shall detail a road map for rolling out the recommendations on suggested interventions in a phased manner, taking in to account the practical implementation issues, budgetary limits, etc.

2. **Digitization and IT Integration Plan –** To achieve a sustained optimization, high level of automation and digitization is required in fleet, operations and service management. This is especially true for large STUs such as MSRTC. To achieve this, planning and scoping for digitization is required to be undertaken. This can be achieved by developing a detailed, digitization and IT integration plan, with the following components:
    a. Audit the current level of digitization achieved and generate a gap assessment based on future level of digitization and IT integration required. Using this, establish the scope of digitization and IT integration based on paper less and key board verses benefit optimization approach.
    b. The digitization and IT integration scope shall include but may not be limited to fleet management, scheduling and planning as well bus and driver performance monitoring cum evaluation.
    c. The scope shall detail the following abilities of one or multiple equipment, software to be procured or developed:
        i. Automation in depot management (and MIS) including information gathering, assimilation, analysis and sharing of fleet, staff, spare parts, fuel, maintenance scheduling, etc. related information
        ii. The ability of the software or tools to identify and raise specific maintenance requirement for fleet, identify issues, etc. (based on defined benchmarks) based on the input data through digitization od depot management and MIS.
        iii. Automation and digitization for gathering, assimilation, analysis and sharing of real time bus location, bus performance and ticketing data.
        iv. Realtime bus scheduling based on real time bus location data, demand parameters (also gathered from real time ticketing data) and other predefined temporal and spatial factors.
        v. Integration of GPS and ITMS software to capture real time bus and crew performance data. This data shall need to be analyzed to evaluate (and highlight shortcomings as part of the software dashboard) crew and bus performance against defined benchmarks.
    d. The plan shall include detailed road map, action plan and budgetary requirement for development, procurement and deployment of identified digitization, automation and IT tools. It shall estimate and detail the level optimization expected to be achieved through the defined interventions, based on expected increase in staff utilization, vehicle utilization, fleet utilization, operational efficiency, occupancy, etc. It shall also provide an assessment on the expected positive impact on patronage, and the impact on expected additional trips attracted. Through these details the plan shall detail a cost benefit analysis for the investments proposed for the defined interventions.
    e. The plan shall include a list of software, equipment or tools required to be inducted in the organization as a part of this plan, along with recommendation for off-the shelf or development approach for the same. Where development is recommended it shall explore the possibility of integrating royalty model with the software developers, if and when the developed software is licensed to other STUs/operators. This recommendation shall be based on a detailed cost benefit analysis.
3. **Staff Training Plan –** A review of case studies and other literature, suggests that training of staff especially crew, plays a critical role in achieving significant reduction in operational and/or other costs. This training is not limited to induction training but should include regular training which aims to refresh the abilities of the crew as per prevailing requirements and technological as well operational developments. This implies that recurring annual training programs with fixed targets

will need to be built in to the administrative structuring and annual organizational budget. This study shall detail these requirements as following:

a. It shall identify the gaps in skill levels of different staff categories and identify optimization and patronage improvement parameters that will be positively affected by addressing these gaps.
b. It shall identify the training programs and define the staff strength or percentage of staff strength (for different categories of staff) that need to be provided these identified training. It shall also identify the frequency of these training programs for each staff category. Some of the training programs that may be included are as following:
    i. Driver training to improve fuel efficiency. Such training is conducted by the Government of India undertaking – Petroleum Conservation Research Authority (PCRA).
    ii. Skill development programs, such as those conducted under national skill development mission.
    iii. Trainings to improve mannerism for staff which have a passenger interface (such as bus crew).
    iv. Specialized equipment training for workshop staff. This may be conducted with bus or equipment manufacturers.
    v. Specialized equipment and software training for other staff, such as planning, traffic and statistical department.
    vi. Specialized leadership training for senior management and administrative staff.
    vii. Generalized safety and other training for all staff.
c. It shall highlight how the proposed training plan shall improve staff productivity and operational efficiency, apart from improving the skill levels and general employability of the staff. It shall also detail the contribution of the proposed training in optimizing existing staff utilization, through re-assignment of excess staff or of overhead staff (in a phased manner over the study period).
d. The plan shall define a road map to roll out this training plan along with the fixed and variable budgetary requirements.
e. The study shall include an economic analysis of the expected benefits of the proposed interventions as listed in the training program. It shall also evaluate these benefits against the expected expenditure (over the study time period, i.e. 30 to 50 years) through a detailed cost benefit analysis.

4. **HR Policy and Administrative Restructuring Plan –** It is understood that current the administrative structure of most STUs and their HR policies, are old and may need revision/re-writing to better cater to new understandings, technological advances, policy changes etc. Additionally, the proposed digitization and training plans are also likely to raise requirements for changes in the current HR policies and administrative structure. These changes are likely to contribute to improving the organizational efficiency, potentially resulting in reduced costs and improved revenues. In order to achieve this, an HR policy and administrative restructuring plan is proposed to be developed. The key features and objectives to be achieved by this plan may include the following:

    a. Evaluate current HR practices and administrative structure against the current and projected (over the study period, i.e. 30 to 50 years) organizational requirements (division and department wise). This should also take in to considerations best practices from other operators (both private and public) and organizations.
    b. Propose a revised administrative structure and HR policies based on the gap assessment. These shall incorporate the following:

i. Build in incentivization mechanism in HR policies, especially for staff whose performance have a direct impact on the profitability of the organization. These include the crew and the maintenance staff.
ii. Build in/revise/review staff category specific increment/promotion norms.
iii. Incorporate measures, norms, administrative structures, to allow re-assignment, or re-habilitation of excess staff (also for overhead staff where required).
iv. Identify divisions departments that may be merged, and or new divisions departments that may need to be formed. Propose the revised administrative and management structure in line with these changes.
v. Identify and propose, functions, responsibilities, etc. which may be outsourced

c. The study shall quantify the economic and other benefits to the organization (over the study period), that may be achieved by undertaking the interventions proposed in the plan. It shall also highlight any expected adverse and/or positive impact on the well-being of the staff (social, moral or economic) as a result of the proposed changes.
d. The study shall estimate the budgetary requirements for undertaking the proposed administrative and HR policy changes. Such a budgetary requirement shall account for any loss of revenue (or other losses) due to disruptions in administrative and HR processes expected as a result of this transition.
e. The study shall include cost benefit analysis that may be used to justify the proposed interventions (listed in the plan) over short and long term.
f. The study shall also propose a detailed action plan and time line for rolling out the recommendations included in the plan.

5. **Business Plan –** Based on the four plans listed above, a detailed business plan for MSRTC can be developed. This plan shall be based on the budgetary, economic and action plan details included in each of the plan, resulting in an overall organizational business plan which shows a clear economic and financial viability of the business. The plan shall highlight the investment requirement and the expected profit loss estimates over a long term – 30 to 50 years. This plan shall be used to seek investments from Government or private entities and/or raise short- or long-term loans from financial institutions. The salient features/inclusions and objectives of this business plan shall be as following:
    a. The plan shall include the current worth of the organization, highlighting fixed and movable assets, past and current expansion and growth, staff strength, expertise, business (service) highlights, etc.
    b. The plan shall detail expected and future market share, current and future plans for growth, current and future plans for operational and service improvement, etc. It should clearly highlight growth trends of cost, revenue and expected revenue showing expected break-even point (year), in different scenarios.
    c. It shall highlight potential fare box and non-fare box revenue sources to be tapped (or planned to be tapped). This shall include details of identified land parcels for potential land banking. These details shall be accompanied with the expected valuation of the same.
    d. The plan shall also include any identified potential of private partnerships in different aspects of the STU functioning such as depot operations, fleet operations, etc.
    e. It shall identify all potential threats and opportunities such as taxation norms and government policies.

8.2.2 Funding and Financing

The business plan should form the basis of the funding approach for investment requirements, estimated as a part of the planning process. The business plan shall be used to generate confidence in

the current or potential financial health of the organization, which shall be useful to seek investments from one or more sources. These may include the following:

- Government funding through state budgetary support, which is also the current route
- Private investments through different public private partnership (PPP) arrangements
- Short- and long-term loans from financial institutions such as national banks, Asian Development Bank (ADB), World Bank, etc.

The funding shall be sought in line with an integrated road map for implementation.

8.2.3 Implementation

After the planning stage and after financing/funding for identified interventions is in place implementation phase begins. This stage begins with identification critical landmarks or milestones in the implementation process. This may be referred to as the pre-implementation stage. At this stage, the Departments/organizations concerned with the implementation of the identified actions should be under an obligation and made responsible to adhere to the time line for the achievement of identified milestones.

For this, there are people to recruit, train, and manage. tasks need to be assigned, completed work needs to be signed off, uncompleted work needs to be re-scheduled, and perhaps re-costed. Solutions for developing problems need to be found quickly. This requires professional management of the implementation process. Project management is a topical area of professional application to achieve the planned objectives rapidly and professionally (Hauc and Kovac, 2000). Professional management of the implementation process should help MSRTC to frame an approach encompassing the entire organization. Thus, the methodology for implementation of planned action should span across multiple levels and departments. The proposed implementation arrangements should follow established procedures and practices as much as possible to enable speedy and efficient implementation. These include:

1. A dedicated project management unit (PMU) should be established in the executing agency, consisting of managerial staff (from different departments) and technical experts assisted by an appointed, professional consultants. These may be project management and transaction advisory consultants amongst others (Project Administration Manual, 2015).

2. To provide strategic direction and oversight, a Project Steering Committee (PSC) should be constituted, with the concerned departments officials such as Human resource, finance, operations administration etc. Each department should also have its Project Coordination Committee (PCC) headed by the respective supervisors or managers. The PCC should identify, initiate, review and approve subprojects (Project Administration Manual, 2015).

3. A dedicated project implementation unit (PIU) should be established by STU's in the implementing agencies headed by a Project Implementation Director. The PIU should be supported through their secondary implementation units embedded in terminals and depots to supervise and implement the approved activities (Project Administration Manual, 2015).

4. Apart from decentralization of the administrative machinery and provision of adequate coordinating mechanisms at the local level, it will be necessary to ensure that at every stage of planning and implementation there is full participation and involvement of the other stake holders. The selection of the specific tasks, however, is governed by local conditions and in assigning priorities it might be necessary to involve both the administration at the local level as well as the representatives of people particularly of the beneficiary groups. This entails formulation and implementation of a detailed communication strategy. This strategy should

help address any doubts about the objectives of the exercise and thus control resistance to the implementation process.

Implementation Actions:
The implementation phase involves putting the project plan into action. Thus implementation, should consider development of a precise action plans as an integral process. To achieve the optimum results out of the action plans, the following points regarding the implementation must be taken in to consideration.

1. The comprehensive plan of action is needed to be drawn up after very careful consideration and exhaustive consultations with the State Governments, Central Ministries and various other organizations concerned with the Plan formulation and its implementation strategies (Planning Commission, 2017). This plan shall include identification of projects, tasks and sub tasks (as identified at the planning stage) for implementation in an integrated and a time bound manner.

2. Consultations should also be held with a wide variety of professional organizations as well as individual experts and communication experts and trade union representatives.

3. The spent over schemes/projects etc. which are included prior plans shall be taken in consideration. This will ensure that on-going schemes/projects are completed expeditiously, and the resources earmarked for them are not spread over many other schemes resulting in neither the on-going schemes being productive, nor the new ones progressing satisfactorily due to sub-critical investment.

4. It is essential a firm time-line is drawn up consisting the date on which the project report will be firmed up considering various parameters specified in the plan. This will Include - the dates on which the sanctioning authority, whether it is the State Government, or the Central Government will be ready with the formal sanction. Additionally, the specific dates on which contracts for various schemes falling under the formulation plan is finalized and the contract documents signed.

5. To ensure that the time table as mentioned above is strictly adhered to, the delegation of authority for investment decisions, clearance of contracts etc. should be considerably enhanced, and indeed a good deal of trust be placed on those who are directly responsible for implementing the strategies.

6. Subsequently, a PERT network should be drawn up for each strategy, mentioned with deadline. There should be no revision backwards of the deadline, and all performance should be judged against the final targets (Planning Commission, 2017).

8.3 Expected Outcomes

By undertaking the actions as explained above, MSRTC can expect to improve on optimization and patronage, which will directly help in improving profitability to the targeted operational profitability by 2032 and overall profitability (break-even), i.e. complete financial independence from state by 2036.

8.3.1 Improved patronage

Improved patronages are expected to be achieved through the following actions.

1. Improvement in accessibility by increase in total route length from current 10.50 Lakhs Km to an expected 12.2 Lakhs km in 2036 (increasing at an average rate of 0.82% or 9332 km every year). Additionally, average route length is also expected to increase from the current 56.25 km to 66.09 km in 2036.
2. Reduction in average waiting time from current average 139 minutes to 123 minutes in 2036. This reduction shall be an outcome of improved frequency of buses on selected routes.
3. Improvement in passenger services and experience through improved terminal and station facilities and improved crew behavior achieved by better training.
4. Improved passenger experience through values added services (luxury/AC services) on routes with expected demand for these services. This may also include integrated feeder facilities to reduce changeover time and to provide door to door connectivity.
5. An improved fare structure which is based on and is responsive to value (of services provided), demand (high and low demand routes) and commuter requirement (including desire/ability to pay).
6. The above factors are expected to result in an improvement in average occupancy from current 70% to 74.96% in 2036 (at the rate of average 0.26% improvement every year).
7. The above factors will also result in an increase in average passenger trips from the current approximately 1.96 crore Per day to 2.75 crore per day in 2036. This amounts to an estimated increase in MSRTC mode share from current 18.68% to 22.41% (at an estimated rate of 0.21% every year), or an increase in ticket to population ration of 0.16 to 0.17 in 2036. This increase in passenger trips not only contributes to increased occupancy but necessitates expansion of the current fleet of buses (with MSRTC) from 18,308 to 20,364 in 2036. This expansion in fleet in turn contributes to improved accessibility and reduced average wait time.

8.3.2 Improved optimization

Improved optimization shall be achieved through the following actions:

1. Improvement in vehicle utilization from average daily 336.26 Km to 339.32 km in 2036. This is expected because of the expected improvement in quality road/highway network, and improvement in crew performance (such as better driving cycle, reduced layover time, reduced dwell time, etc.) achieved through better training.
2. Improvement in fleet utilization from 89.97% to 93.57% by 2036. This is expected to be achieved through the reduction in average age of vehicles, improved scheduled as well unscheduled maintenance through better maintenance facilities (including better depot infrastructure, better equipment and better staff training) and better driver training resulting in improved driving cycle and driver performance, leading to reduced wear and tear as well damages (such as in accidents). Reduction in accidents is also likely to result in reduced insurance costs, reduced costs in litigation as well claims.
3. Improved efficiency in the usage of fuel and other consumables. This shall be achieved through driver training (improved driving cycle directly effecting fuel consumption improvement by 5-15 percent Kmpl), incentivization plan (incentivizing crew which achieve fuel efficiency over a defined benchmark), improved maintenance facilities (including infrastructure, spares and maintenance staff training) and use of better as well newer fleet of buses.
4. Reduced staff (including outsourced staff) to bus ratio from current average 6.14 to 5.34 in 2036. This is expected to change at the rate of 10% every year. The optimized staff to bus ratio

shall be achieved through induction of better operations and management techniques, and through improved staff training and potential re-assignment. Improvement and operations and management with reduced staff is expected to be achieved through the induction of IT integrations, digitization and active analytics (especially at depots and terminals). Reduced fleet age and any improvement in scheduled maintenance practices shall also result in reduced workshop staff requirements. Improved planning of depot and terminal infrastructure can reduce the requirement of overhead staff (such as guards, etc.).

5. Improved operations and service planning. Route and operational planning which is more responsive to changing demand will result in better utilization of fleet, leading to increased average occupancy. This can be achieved by both active and passive data collection and analytics.
6. Better utilization of existing land parcel. It is estimated that the total land parcel used for depots and terminals and in possession of MSRTC is in the range of 1,051 hectares. Projections show that 51% of this land, i.e. 536 hectares will not be utilized for MSRTC functions for the next 30 years. A planned redevelopment of such identified land parcels will not only result in improved non-fare box revenue (through land monetization) but also result in redeveloped, modern depot and terminal facilities for the corporation.
7. Partnering with specialized entities. It is expected that MSRTC can optimize components of its operations through planned partnership with specialized entities (including private entities) which can contribute to significant savings through improved efficiency and utilization of available resources. This may include operation of buses, maintenance of fleet, management as well maintenance of infrastructure, etc.
8. Reduced taxation. A planned expansion of fleet and commuter base will help MSRTC justify reduced taxation without denting the fiscal revenue for the state. The resultant savings for MSRTC will not only help better its financial health but also holds the potential for reduced fares, leading to increased patronage.

9 Comparison and Conclusion

As per MSRTC, urban bus operations will be handed over to municipal corporations of every city. Therefore, urban fleet shall gradually decrease to zero in 6-8 years' period. Gradually MSRTC will only focus on regional inter-state trips.

Basis the current urban/rural population growth rate, urban population will be growing at a much faster rate than rural population. Thus, share of urban trips in overall trips undertaken across the state shall increase, while rural regional intercity trips shall decrease. Even though total number of urban and rural trips are increasing. Because of this, in the mode share scenario, the current share of rural regional intercity trips is retained. However, it is observed that in the mode share retain scenario, the overall mode share (in the state) of MSRTC reduces from 7.57% in 2018 to 6.02% in 2051. In the business as usual scenario, since the future focus is going to be only on rural intercity city trips, the intercity mode share is expected to increase from 18.68% in 2018 to 21.97% in 2051. However, since intracity operations will cease to exist, the overall mode share of MSRTC is declining marginally from 7.57% in 2018 to 7.05% in 2051. And in the desirable scenario, where a desired mode share of 25% is expected in 2051 for intercity trips, it is observed that in doing so, the overall mode share also experiences a marginal increase from 7.57% in 2018 to 8.01% in 2051 (Table 18).

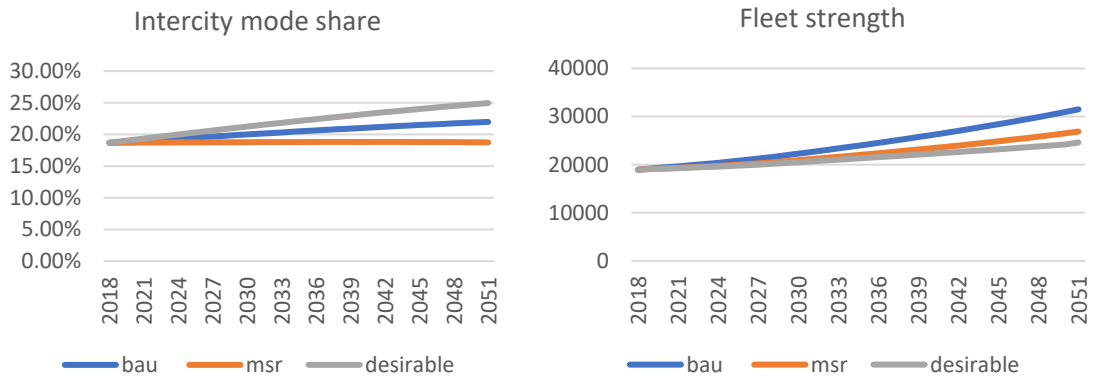


Figure 25: Comparative Graphs – fleet strength and mode share in business as usual and mode share retain scenario.

Table 18: Projected Horizon Year Mode Share Comparison for two scenarios

Mode share	Business as usual Scenario		Mode share retain Scenario		Desirable scenario	
Year	Intercity mode share	Overall mode share	Intercity Mode share	Overall mode share	Intercity mode share	Overall mode share
2018	18.68%	7.57%	18.68%	7.57%	18.68%	7.57%%
2051	21.97%	7.05%	18.68%	6.02%	24.94%	8.01%

The fleet size has an increasing trend in all the scenarios. In a business as usual scenario, the fleet strength is expected to be almost double its value by 2051 from its current value. In the mode share scenario, the fleet strength increases to 18954 in 2018 to 26866 in 2051. Whereas, in a desirable scenario, the fleet strength is observed to increase only to 24604.

Now, a profitability scenario is created which tweaks the fleet utilization, occupancy and staff to bus ratio, achievable value in the future, to analyze the level of per bus loss reduction that can be achieved. This is important because, in the current scenario with per bus losses, the overall losses and burden for the state mounts with each bus added to the fleet. This makes it less attractive for the State Transport Undertakings to expand the current fleet. However, if the corporation becomes marginally profitable (or even if per bus loses are reduced considerably) then fleet expansion can become a viable approach.

The profitability scenarios tests this hypothesis. And the analysis of the results shows that a reduction of staff to ratio can have a significant impact on reducing losses. Additionally, attempts at increasing occupancy are also likely to bear fruits in terms of reduced losses. Table 19 presents the comparison of estimated losses in the two scenarios for profitability studied in the previous section.

Table 19: Comparison of estimated losses for profitability

S.no	Profitability Factors	Desirable scenario Fleet utilization		Increase in %load factor		Increase in fleet utilization + staff bus ratio + Increase in ride ship	
		2018	2051	2018	2051	2018	2051
1	Fleet utilization	90%	97%	90%	97%	90%	97%
	Rate of change	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
2	%Load factor Inter-city	70%	72%	70%	78%	70%	78%
	Rate of change	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
3	Staff to bus ratio	6	6	6	6	6	5.2
	Rate of change	10%	10%	10%	10%	10%	10%
4	Loss (in Crores)	-1527.30	-1249.49	-1477.66	-192.08	-1477.66	+398.52

Table 20 presents the base year data inputs in the tool for all scenario development. Table 21 presents the default mode share and rate of changes considered for developing the three scenarios and Table 22 presents the outputs generated for all the scenarios.

Table 20: Base year Inputs

Base Year Data (2017)	
Mode-share (Overall) –	18.68%
Intercity STU Trips per day in	6493439
Fleet Strength	18073
Fleet utilization – Intercity	90%
Efficiency – Intercity	99%
%Load factor	70%

Total Routes	18671
Staff Ratio	6.24
Earning Per Kilometer	34.110
Cost Per Kilometer	36.710

Table 21: Target value Scenario- wise Comparison

Target Values (Defaults)	Business as usual	Current Mode Share	Desirable scenario
Achievable target mode share (Intra City Trips) - IPT for less than 10km trip length	5.61%	5.61%	5.61%
Achievable target mode share (Intra City Trips) - STU Bus for less than 10km trip length	0.00%	0.00%	0.00%
Achievable target mode share (Intra City Trips) - Other Bus for less than 10km trip length	16.19%	16.19%	16.19%
Achievable target mode share (Intra City Trips) - IPT for more than 10km trip length	25.58%	25.58%	25.58%
Achievable target mode share (Intra City Trips) - STU Bus for More than 10km trip length	0.00%	0.00%	0.00%
Achievable target mode share (Intra City Trips) - Other Bus for More than 10km trip length	24.59%	24.59%	24.59%
Achievable target mode share (Inter City Trips) - IPT for less than 10km trip length	0.00%	9.28%	0.00%
Achievable target mode share (Inter City Trips) - STU Bus for less than 10km trip length	28.89%	14.39%	28.89%
Achievable target mode share (Inter City Trips) - Other Bus for less than 10km trip length	0.00%	2.84%	0.00%
Achievable target mode share (Inter City Trips) - IPT for More than 10km trip length	2.71%	11.63%	2.71%
Achievable target mode share (Inter City Trips) - STU Bus for More than 10km trip length	64.63%	24.13%	64.63%
Achievable target mode share (Inter City Trips) - Other Bus for More than 10km trip length	2.26%	29.76%	2.26%
Targeted %load factor	70.00%	70%	74%
Targeted Fleet utilization	90%	90%	95%

Operational Efficiency	102%	102%	100%
Staff ratio	10%	6.24	6

Table 22: Projected Outputs Scenario- wise Comparison

Scenario Comparison 2051	**Business as usual**	**Current Mode Share**	**Desirable scenario**
Mode-share (Overall) - MSRTC	7.05%	6.02%	8.01%
MS RTC Trips per day in crores	5.09	5.09	5.09
Fleet Strength	31492	26866	21673
Fleet utilization	90%	90%	95%
Efficiency	98.9%	98.9%	100%
Staff ratio	6.24	6.24	6
%Load factor (Intra and Inter)	70%	70%	72.3%
Total Routes	34868	28039	20255
Total Buses to be Procured in year	1641	1177	1059
Total Buses to be Scrapped in year	1087	814	647
Number of terminals to be developed annually	11	7	9
Total Bus Terminal in year	661	564	517
Number of Depots to be developed annually	6	4	4
Total Bus Depot in year	315	269	246
Annual Land to be developed in Hectares	12.92	8.46	9.62
Annual Budget in Crores	413	333	312
Annual Staff requirement	3452	2261	2456

Additionally, from the gap assessment done for 31 divisions with the help of checklist circulated to MSRTC for both terminals and depots, it is calculated that MSRTC has additional 216 hectares of land available for development of depots as per ASRTU standards to meet the current demand. Now, based on the fleet estimate in a future desirable scenario, it is observed that MSRTC requires an additional land of 28.53 hectares by 2028, 56.57 hectares by 2038 and 86.82 hectares by 2048 for depots. Which

indicates that 187.47 hectares by 2028, 159.43 hectares by 2038 and 129.18 hectares of land in 2048 will still be available to MSRTC for monetization of depots.

Similarly, an additional land of 299 hectares is available for development of terminals. After subtracting the additional land required from the total additional land available in each 10-year arrangement, it is observed that for monetization of terminals, MSRTC has a land availability of 285.89 hectares by 2028, 273.01 hectares by 2038 and 259.25 hectares by 2048.

Overall, it can be said that the desirable scenario will produce maximum benefits for MSRTC since it is able to achieve the least fleet strength required in the horizon year, maximum mode share and increased efficiency. Also, there is a significant portion of land available for monetization of terminals and depots on which further advisory support can be provided. The resultant output will be useful to MSRTC in developing a long-term business investment and a resultant action plan.

10 Annexure

10.1 List of inputs

S.No.	List of Inputs – Dashboard: Fleet estimation Tool
1	Current Year
2	Current Intra City Bus Fleet
3	Current Intra City per bus seating Capacity
4	Current Inter City Bus Fleet
5	Current Inter City per bus seating capacity
6	Current year fleet utilization (Intra City)
7	Current year fleet utilization (Inter City)
8	Current year operational efficiency (Intra City)
9	Current year operational efficiency (Inter City)
10	Percent of fleet size with age <=1 year
11	Percent of fleet size with age >1 to 2 years
12	Percent of fleet size with age >2 to 3 years
13	Percent of fleet size with age >3 to 4 years
14	Percent of fleet size with age >4 to 5 years
15	Percent of fleet size with age >5 to 6 years
16	Percent of fleet size with age >6 to 7 years
17	Percent of fleet size with age >7 to 8 years
18	Percent of fleet size with age >8 years
19	Percent of fleet size with age <=1 year
20	Percent of fleet size with age >1 to 2 years
21	Percent of fleet size with age >2 to 3 years
22	Percent of fleet size with age >3 to 4 years
23	Percent of fleet size with age >4 to 5 years
24	Percent of fleet size with age >5 to 6 years
25	Percent of fleet size with age >6 to 7 years
26	Percent of fleet size with age >7 to 8 years
27	Percent of fleet size with age >8 years
28	Data Year
29	Total urban population
30	Total rural population
31	Total daily intra city work trips from urban area (<=10km)
32	Total daily intra city work trips from urban areas (>10km)
33	Total daily inter city work trips from rural areas (<10km)
34	Total daily inter city work trips from rural areas (>=10km)
35	Total daily intra city education trips from urban area
36	Total daily inter city education trips from rural areas
37	Daily same day trips
38	Daily overnight trips

39	Daily Foreign Trips
40	Daily same day trips
41	Daily overnight trips
42	Daily Foreign Trips
43	Average trip length of intra city trips
44	Average trip length on inter city trips
45	Mode share of IPT trips (trip length <=10km)
46	Mode share of Bus trips (trip length <=10km)
47	Mode share of IPT trips (trip length >10km)
48	Mode share of Bus trips (trip length >10km)
49	Mode share of IPT trips (trip length <=10km)
50	Mode share of Bus trips (trip length <=10km)
51	Mode share of IPT trips (trip length >10km)
52	Mode share of Bus trips (trip length >10km)
53	Tourist trips as percent of non-work same day trips
54	Tourist trips as percent of non-work overnight trips
55	Tourist trips as percent of non-work Foreign trips
56	Percent of intercity trips >10km originating from urban area
57	No. of daily intra city STU trips
58	No. of daily intercity STU trips
59	Total number of intra city routes operated daily
60	Average route length of intra city routes (km)
61	Total number of (bus) trips (one way) on intra city routes
62	Total number of intercity routes operated daily
63	Average route length of intercity routes (km)
64	Total number of (bus) trips (one way) on intercity routes
65	Intra city %load factor (% of seating capacity)
66	Intercity %load factor (% of seating capacity)
67	Average annual urban population growth rate
68	Average annual rural population growth rate
69	Expected average tourism growth rate over next 30 years
70	Current Intra City average staff per bus for the STU
71	Current Inter City average staff per bus for the STU
72	Earning per km Intracity
73	Earnings per Pass (Intra City)
74	Ticket price per km (Intra City)
75	Average trip length per pass. (Intra City)
76	Operating cost per km (Intra city)
77	Earning per km Inter city
78	Earnings per Pass (Inter City)
79	Ticket price per km (Inter City)
80	Average trip length per pass. (Inter City)
81	Cost per km (Intercity)

10.2 List of default values

Sno	List of Default Values: Fleet estimation Tool
1	Expected annual improvement in fleet utilization (if current <90%) - Intra City
2	Expected annual improvement in fleet utilization (if current <99%) - Intra City
3	Expected annual improvement in fleet utilization (if current >=99%) - Intra City
4	Expected annual improvement in fleet utilization (if current <90%) - Inter City
5	Expected annual improvement in fleet utilization (if current <99%) - Inter City
6	Expected annual improvement in fleet utilization (if current >=99%) - Inter City
7	Annual expected improvement in operational efficiency 'GAP' (other than fleet utilization) - Intra City
8	Annual expected improvement in operational efficiency 'GAP' (other than fleet utilization) - Inter City
9	Average annual increase in income levels
10	Average expected life of a Type 1 - Intra City Bus
11	Average expected life of a Type 2 - Intra City Bus
12	Average expected life of a Type 3 - Intra City Bus
13	Average expected life of a Type 1 - Inter City Bus
14	Average expected life of a Type 2 - Inter City Bus
15	Average expected life of a Type 3 - Inter City Bus
16	Achievable target mode share (Intra City Trips) - IPT for less than 10km trip length
17	Achievable target mode share (Intra City Trips) - STU Bus for less than 10km trip length
18	Achievable target mode share (Intra City Trips) - Other Bus for less than 10km trip length
19	Achievable target mode share (Intra City Trips) - IPT for more than 10km trip length
20	Achievable target mode share (Intra City Trips) - MSRTC Bus for More than 10km trip length
21	Achievable target mode share (Intra City Trips) - Other Bus for More than 10km trip length
22	Achievable target mode share (Inter City Trips) - IPT for less than 10km trip length
23	Achievable target mode share (Inter City Trips) - STU Bus for less than 10km trip length
24	Achievable target mode share (Inter City Trips) - Other Bus for less than 10km trip length
25	Achievable target mode share (Inter City Trips) - IPT for More than 10km trip length
26	Achievable target mode share (Inter City Trips) - STU Bus for More than 10km trip length
27	Achievable target mode share (Inter City Trips) - Other Bus for More than 10km trip length
28	Annual rate of Change (Intra City Trips) - IPT for less than 10km trip length
29	Annual rate of change (Intra City Trips) - STU Bus for less than 10km trip length
30	Annual rate of change (Intra City Trips) - OTHER Bus for less than 10km trip length
31	Annual Rate of change (Intra City Trips) - IPT for more than 10km trip length
32	Annual rate of change (Intra City Trips) - STU Bus for More than 10km trip length
33	Annual rate of change (Intra City Trips) - OTHER Bus for More than 10km trip length
34	Annual rate of change (Inter City Trips) - IPT for less than 10km trip length
35	Annual rate of change (Inter City Trips) - STU Bus for less than 10km trip length
36	Annual rate of change (Inter City Trips) - OTHER Bus for less than 10km trip length
37	Annual rate of change (Inter City Trips) - IPT for More than 10km trip length

38	Annual rate of change (Inter City Trips) - STU Bus for More than 10km trip length
39	Annual rate of change (Inter City Trips) - OTHER Bus for More than 10km trip length
40	Percent of same day non work trips from within state
41	Percent of overnight non work trips from within state
42	Percent of same day non work trips less than 10km
43	Percent of overnight non work trips from within state
44	Percent of overnight non work trips less than 10km
45	Percent of same day non work trips by city bus
46	Percent of same day non work trips by intercity bus
47	Percent of overnight non work trips by city bus
48	Percent of overnight non work trips by intercity bus
49	Percent non-work trips that are intra-city
50	Intra city non work trips <10km by bus
51	Intra city non work trips >10km by bus
52	Inter city non work trips <10km by bus
53	Inter city non work trips >10km by bus
54	Intra city non work trips <10km by IPT
55	Intra city non work trips >10km by IPT
56	Inter city non work trips <10km by IPT
57	Inter city non work trips >10km by IPT
58	Percent of STU Intra city trips <10km as percent of total intra city non work trips by bus
59	Percent of STU Intra city trips >10km as percent of total intra city non work trips by bus
60	Percent of STU Inter city trips <10km as percent of total intra city non work trips by bus
61	Percent of STU Inter city trips >10km as percent of total intra city non work trips by bus
62	Percent of same day education trips less than 10km in urban areas
63	Percent of same day education trips less than 10km by public buses in urban areas
64	Percent of same day education trips less than 10km by IPT in urban areas
65	Percent of same day education trips more than 10km by public buses in urban areas
66	Percent of same day education trips more than 10km by IPT in urban areas
67	Percent of same day education trips less than 10km in rural areas
68	Percent of same day education trips less than 10km by public buses in rural areas
69	Percent of same day education trips less than 10km by IPT in rural areas
70	Percent of same day education trips more than 10km by public buses in rural areas
71	Percent of same day education trips more than 10km by IPT in rural areas
72	Non Work bus trips origin from HP (travelling outside state) as percent of non-work bus trips in state
73	Non-work IPT trips origin from HP (travelling outside state) as percent of Non-work IPT trips in state
74	Work bus trips origin from other states (travelling to state) as percent of work bus trips in state
75	Work IPT trips origin from outside state (travelling to state) as percent of work IPT trips in state
76	Desired/Target %load factor as percent of average seating capacity (Intra City buses)
77	Desired/Target %load factor as percent of average seating capacity (Inter City buses)
78	Ultimate achievable intra city trip length

79	Expected annual percent change in Intra city trip length
80	Ultimate achievable average inter city trip length
81	Expected annual percent change in intercity trip length
82	Ultimate achievable average number of intra city trips per bus per day
83	Expected change in average number of intra city trips per bus per day
84	Ultimate achievable average number of inter city trips per bus per day
85	Expected change in average number of inter city trips per bus per day
86	Expected maximum average route length for Intra city trips
87	Expected annual change in average intra city route length
88	Expected maximum average intercity route length
89	Expected annual change in average inter city route length
90	Average Cost of Intra City Bus Type 1
91	Average Cost of Intra City Bus Type 2
92	Average Cost of Intra City Bus Type 3
93	Average Cost of Inter City Bus Type 1
94	Average Cost of Inter City Bus Type 2
95	Average Cost of Inter City Bus Type 3
96	Average expected revenue from scrapping of Intra City Mini Bus
97	Average expected revenue from scrapping of Intra City Regular Bus
98	Average expected revenue from scrapping of Intra City Luxury Coach
99	Average expected revenue from scrapping of Inter City Mini Bus
100	Average expected revenue from scrapping of Inter City Regular Bus
101	Average expected revenue from scrapping of Inter City Luxury Coach
102	Land Required per bus for intra city depot development
103	Land Required per bus for inter city depot development
104	Land Required per bus for intra city terminal development
105	Land Required per bus for inter city terminal development
106	Cost per bus for developing intra city depot
107	Cost per bus for developing Inter city depot
108	Cost per bus for developing intra city terminal
109	Cost per bus for developing Inter City Terminal
110	Average intra city depot capacity
111	Average Inter City Depot Capacity
112	Average Intra city terminal capacity
113	Average Inter city terminal capacity
114	Factor to relate Intra city terminal capacity to bus fleet (Fleet/(Capacity*X), where X=)
115	Factor to relate Inter city terminal capacity to bus fleet (Fleet/(Capacity*X), where X=)
116	% of non local STU buses using inter city terminal (as % of STU buses)
118	INTRA CITY - Mini Buses
119	INTRA CITY - Regular Buses
120	INTRA CITY - Luxury Buses
121	INTER CITY - Mini Buses
122	INTER CITY - Regular Buses
123	INTER CITY - Luxury Buses

124	Average Intra City Seating Capacity
125	Average Inter City Seating Capacity
126	Rate of change of occupancy % as % of gap (Intra City buses)
127	Rate of change of occupancy % as % of gap (Inter City buses)
128	Target/intended average staff number for each bus (Intra City)
129	Expected annual percentage change in staff to us ration (Intra City)
130	Target/intended average staff number for each bus (Inter City)
131	Expected annual percentage change in staff to us ration (Inter City)
132	Target Operational Efficiency Intra City
133	Target Operational Efficiency Inter City
134	Target Intra city buses per route
135	Average annual rate of change of (as percent of current ratio) of Intra buses per route
136	Target Inter city buses per route
137	Average annual rate of change of (as percent of current ratio) of Intra buses per route
138	Current average operational hours - Intra City
139	Current average operational hours - Inter City
140	Average staff salary Intercity (per month)
141	Average staff salary Intracity (per month)

10.3 List of outputs

Sno	List of Outputs: Fleet estimation Tool
1	Yearwise Budgetary Requirement (Crores) for Fleet and Infrastructure
2	Year Wise Budgetary Requirement for Intra and Inter City Services
3	Expected Yearwise Land (Hectares) and Fleet Aquisition Requirement
4	Expected Yearwise Depot and Terminal Development Requirement
5	Expected Yearwise Growth in Seat Requirement
6	Yearwise Intracity Bus Fleet Procurement Requirement
7	Yearwise Intercity Bus Fleet Procurement Requirement
8	Expected Yearwise Intracity Fleet Growth
9	Expected Yearwise Intercity Fleet Growth
10	Expected Yearwise Cumulative Land Requirement for Intra City Fleet
11	Expected Yearwise Cumulative Land Requirement for Intercity Fleet
12	Expected Yearwise Cumulative Fleet and Land Requirement
13	Expected Yearwise Growth in Number of Trips
14	Expected Yearwise Growth in Bus Trips
15	Expected Yearwise Growth in Intracity PT Trips
16	Expected Yearwise Growth in Intercity PT Trips
17	Yearwise Intracity Bus Trips by Puspose
18	Yearwise Intercity Bus Trips by Purpose
19	Yearwise Intracity Trips by Distance
20	Yearwise Intercity Trips by Distance
21	Yearwise PT Intra City mode share (<=10km)

22	Yearwise PT Intracity mode share (>10km)
23	Yearwise PT Intercity mode share (<=10km)
24	Yearwise PT Intercity mode share (>10km)
25	Annual Intracity services and Efficiency Improvement
26	Annual Intercity services and Efficiency Improvement
27	Annual Additional Staff Recruitment Requirement
28	Year wise Total Staff strength
29	Expected Staff to Vehicel Ratio
30	Projected Number of routes
31	Projected Headway in minutes
32	Expected trip lengths city and intercity
33	Expected Operating cost City and Intercity
34	Intra city - Expected Annual Operating cost ,Earning and Total profit
35	Inter city - Expected Annual Operating cost ,Earning and Total profit
36	Total (Inter city +Intercity) - Expected Annual Operating cost ,Earning and Total profit
37	Profit before taxes after Infrastructure development and Fleet Upgradation cost

10.4 Bus depot checklist

SGArchitects

SHAKTI SUSTAINABLE ENERGY FOUNDATION

BUS DEPOT CHECKLIST

	Questions	Anwers		Explanation/Comments
A	**Basic Information**			
1	Depot Name & Location			
2	Depot Site area *(Ha)*		*Hectare*	*Write total depot site area including all functions*
3	Total Fleet size catered by the depot			*Mention number of buses catered by this depot or assigned to this depot*
4	Total Fleet size catered per day			*Mention total number of buses that visit the depot in a day*
5	Bus parking numbers			*Mention maximum number of buses that park in the depot at a given time*
B	**Bus Facilities**			
6	Bus Entry & Exit *(wether manned or not)*	Yes/No		*Does the bus entry/exit designed with security checking or not?*
7	No. of Gates		No.	*Mention number of entry/exit gates*
C	**Fleet Type and numbers**	Regular (10-12m) bus	Mini bus	
8	Diesel	*Nos.*	*Nos.*	Mention "0" if specified buses are not catered. For example if depot does not cater CNG buses mention 0 for both regular and mini buses
9	CNG	*Nos.*	*Nos.*	
10	Total Fleet (Diesel + CNG)	*Nos.*	*Nos.*	
11	Wether defined Parking bays exist in the bus parking area at te depot? *(Y/N) - Tick one*	*Yes*	*No*	*Defined parking bays are bus parking spots/boxes marked by curb stones or paint marking in the bus parking area.*
D	**Depot Operations**			
12	Bus servicing sequence	( ) Parking		*Mark the activity sequence numbers inside the bracket. For example if bus goes for fueling first, followed by inspection, mention 1 in fueling and 2 in inspection, and so on.*
		( ) Fueling		
		( ) Inspection		
		( ) Workshop		
		( ) Washing		
13	Role of the STU/Depot driver - **Tick one for each function**	STU driver/Depot driver - Parking		*Tick one to indicate which of the two - bus crew (STU driver) or depot staff (depot driver) - drives the bus to the listed functions in the depot*
		STU driver/Depot driver - Fueling		
		STU driver/Depot driver - Inspection		
		STU driver/Depot driver - Workshop		
		STU driver/Depot driver - Washing		
14	What are the access control to Bus crew (Driver & Conductor)? (Tick One)	Bus crew has limited or controlled access to bus parking only		*Explain the access control for Bus driver and conductor in the depot.*
		Bus crew has un-obstructed access to bus parking only		
		Bus crew has un-obstructed access to most depot functions including workshop		
		Any other:		
15	Does the depot has a computerisaded MIS system - Tick one	Yes	No	*MIS is a Computerised system for recording, maintaining and analysing all bus and depot*
E	**Staff Utilities at the Depot (do not include no functional or non operational utilities/fixtures)**			
16	Canteen Facility for all staff in the depot		*Nos.*	*Mention total number of canteens*
	Covered/enclosed seating area - Total for all canteens (write "0" if no canteens exist)		*sqm*	*Mention only covered/enclosed dedicated seating area for canteen*
	Kitcken area - Total for all canteens (write "0" if no canteens exist)		*sqm*	*Mention only covered/enclosed dedicated kitchen area for canteen*
17	*Are there separate toilets for female staff/visitors*	*Yes*	*No*	*Tick one - **If no separate female toilets exist (or toilets are common) - mention "0" for female toilets and fixtures below***

10.5 Bus terminal checklist

SGArchitects

SHAKTI SUSTAINABLE ENERGY FOUNDATION

BUS TERMINAL CHECKLIST

FORM A - *Fill up based on site observations, secondary data and stakeholder reequirement*

A	Questions	Anwers			Comments
1	Terminal Name & Location				
2	Terminal Site area *(Ha)*	*Hectare*			*Write total terminal site area including all functions*
3	Terminal Typology *(tick one)*	*ISBT*	*Local*	*Combined*	*Select the function served by the terminal.*
4	Terminal Operation *(tick one)*	*Fixed route-bay allocatio*	*Dynamic route-bay allocation*		*Select the available bus route operation type. Whether the terminal has fixed bays for specific operational route or dynamic bays for all routes?*
5	Fleet size in peak hour				*Mention total number of buses that visit the depot in a peak hour*
6	Terminal Size *(tick one)*	Small *<= 60 buses per hour*	Medium *60 to 300 buses per hour*	Large *> 300 buses per hour*	*Select based on planned or horizon year flow Terminal Size*
7	Observed average layover time *(min)*	*min*			*Write average timetaken by bus inside terminal (including drop off, pick up, waiting and circulation time)*
8	Existing Bus bay *(numbers)*	Offloading-	Loading-	Idle-	*Write the total number of drop off, pickup and waiting bays available on site*
9	Boarding bay arrangement *(tick one)*	Saw tooth	Angular	Perpendicular	*Choose the pick up bay arrangement from the options*
		Linear	Drive Through		
10	Drop off bay arrangement *(tick one)*	Saw tooth	Angular	Perpendicular	*Choose the alighting bay arrangement from the options*
		Linear	Drive Through		
11	Idle bay arrangement *(tick one)*	Saw tooth	Angular	Perpendicular	*Choose the waiting bay arrangement from the options*
		Linear	Drive Through		
12	Bus maintenance infrastructure *(tick one)*	On site	Off site		*Bus maintenance/servicing facility available on site or off site?*
13	Designated Private vehicle parking *(numbers)*	**Yes/No**	2 Wheeler	4 Wheeler	*Designated private vehicle parking available on site, choose Yes/No. Write number of 2-wheeler and 4-wheeler parking bays available for terminal and commercial area.*
		For Terminal (Staff+Visitors)			
		Real estate			
		Total			
14	Private vehicle parking type *(tick one)*	Structured	At Grade	Shared	*Choose the private vehicle parking type option available on site*
		At Grade+building basement		On Street	
15	Private vehicle parking arrangement *(tick one)*	Angled (30, 45 or 60 degree)	Perpendicular	Parallel	*Choose the private vehicle parking arrangement option available on site*
16	Designated Feeder service infrastructure *(tick one)*	Yes/No			*Choose the availability and type of feeder infrastructure on site*
		Intermodal	Feeder Lanes	Feeder Bays	
17	Provision for parking and/or bays for feeder vehicles	Auto Rick.-	Cycle Rick.-	Taxi-	*Write the designeted bays available on site for different feeder options*
		Shared van/jeep-		Bus-	
18	Funding methdology - infra. dev. *(tick one)*	100% public funding	Private equity through PPP format		*Choose the funding option used for terminal infrastructure development.*
19	Commercial/Real estate development	Yes/No			*Is there any kind of Commercial/Real estate development available on site?*
20	Separate arrival and departure Concourse	Yes/No			*Select 'Yes' if terminal has separate Arrival and Departure blocks, otherwise select 'No'.*
21	Broad functionwise area *(sqm)*	Bus Area		*sqm*	*Write the area for each function.*
		Private vehicle parking		*sqm*	
		Feeder-pick/drop		*sqm*	
		Circulation		*sqm*	
		Building footprint		*sqm*	
		Arrival concourse		*sqm*	
		Departure concourse		*sqm*	

10.6 Tool inputs

10.6.1 Business as usual scenario

	CURRENT YEAR								
S.No	Item	Value	Error Check						
1	Current Year	2018	OK						
	FLEET DETAILS								
		Bus Type 1	Error Check	Bus Type 2	Error Check	Bus Type 3	Error Check	Total	Average seating capacity
	Item	Mini/ Midi buses		Regular Buses		Luxury Coaches			
2	Current Intra City Bus Fleet	0	ERROR	561	OK	0	ERROR	561	
3	Current Intra City per bus seating Capacity	0	ERROR	44	OK	0	ERROR		44
4	Current Inter City Bus Fleet	507	OK	17439	OK	127	OK	18073	
5	Current Inter City per bus seating capacity	31	OK	43.48237	OK	49	OK		43.17097607
								18634	
	FLEET UTILIZATION AND OPERATIONAL EFFICIENCY								
	Item	Value (%)	Error Check						
6	Current year fleet utilization (Intra City)	90%	OK						
7	Current year fleet utilization (Inter City)	90%	OK						
8	Current year operational efficiency (Intra City)	99%	OK						
9	Current year operational efficiency (Inter City)	99%	OK						
	FLEET AGE								
	Item	Value (%)	Error Check						
	INTRA CITY FLEET	Mini/ Midi buses		Regular Buses		Luxury Coaches			
10	Percent of fleet size with age <=1 year	0%	ERROR	4%	OK	0%	ERROR		
11	Precent of fleet size with age >1 to 2 years	0%	ERROR	9%	OK	0%	ERROR		
12	Precent of fleet size with age >2 to 3 years	0%	ERROR	4%	OK	0%	ERROR		
13	Precent of fleet size with age >3 to 4 years	0%	ERROR	8%	OK	0%	ERROR		
14	Precent of fleet size with age >4 to 5 years	0%	ERROR	16%	OK	0%	ERROR		
15	Precent of fleet size with age >5 to 6 years	0%	ERROR	12%	OK	0%	ERROR		
16	Precent of fleet size with age >6 to 7 years	0%	ERROR	14%	OK	0%	ERROR		
17	Precent of fleet size with age >7 to 8 years	0%	ERROR	16%	OK	0%	ERROR		
18	Precent of fleet size with age >8 years	0%	ERROR	17%	OK	0%	ERROR		
	Total	0%		100%		0%			
	INTER CITY FLEET	Mini/ Midi buses		Regular Buses		Luxury Coaches			
19	Percent of fleet size with age <=1 year	0%	OK	4%	OK	19%	OK		
20	Precent of fleet size with age >1 to 2 years	0%	OK	10%	OK	54%	OK		
21	Precent of fleet size with age >2 to 3 years	0%	OK	4%	OK	0%	OK		
22	Precent of fleet size with age >3 to 4 years	0%	OK	9%	OK	0%	OK		
23	Precent of fleet size with age >4 to 5 years	0%	OK	17%	OK	0%	OK		
24	Precent of fleet size with age >5 to 6 years	100%	OK	13%	OK	13%	OK		
25	Precent of fleet size with age >6 to 7 years	0%	OK	14%	OK	14%	OK		
26	Precent of fleet size with age >7 to 8 years	0%	OK	11%	OK	0%	OK		
27	Precent of fleet size with age >8 years	0%	OK	18%	OK	0%	OK		
	Total	100%		100%		100%			
	TRIP AND CITY PROFILE DATA (CENSUS AND OTHER REPORTS)								
	Item	Value (no. of trips)	Error Check						
28	Data Year	2011	OK						Population - 2011
									50818259
29	Total urban population	5,08,18,259	OK		Census				61556074
30	Total rural population	6,15,56,074	OK						112374333
	NO. OF TRIPS (TOTAL DAILY WORK TRIPS)								
31	Total daily intra city trips from urban area (<=10km)	2,08,05,642	OK	0.86					Trip rate
32	Total daily intra city trips from urban areas (>10km)	33,14,967	OK		Census				**2.5**
33	Total daily inter city trips from rural areas (<10km)	66,31,986	OK	0.43					Work trips
34	Total daily inter city trips from rural areas (>=10km)	89,16,293	OK						3,96,68,888
									Educational trips
	NO. OF TRIPS (TOTAL EDUCATION TRIPS)								3,25,48,832
35	Total daily intra city trips from urban area	1,97,91,269	OK						
36	Total daily inter city trips from rural areas	1,27,57,562	OK						
	NO. OF BUS TRIPS (TOTAL DAILY NON WORK TRIPS) Intra + Inter city								Non work trips by Bus
37	Daily same day trips	40,80,376	OK						42,21,852
38	Daily overnight trips	1,41,464	OK						
39	Daily Foreign trips	13	OK						
	NO. OF IPT TRIPS (TOTAL DAILY NON WORK TRIPS) Intra + Inter city								Non work trips by IPT
40	Daily same day trips	15,68,982	OK						16,42,172
41	Daily overnight trips	49,718	OK						7,80,81,744
42	Daily trips by foreign visitors	23,472	OK						
	AVERAGE TRIP LENGTH								
	Item	Value (Km)	Error Check						
43	Average trip length of intra city trips	7.48	OK						
44	Average trip length on inter city trips	26.57	OK		Census				

	Item	Value (%)	Error Check						
	INTRA CITY TRIPS (MODE SHARE) Wprl Trips								
45	Mode share of IPT trips (trip length <=10km)	5.013%	OK					Work Tips	Non Work Trips
46	Mode share of Bus trips (trip length <=10km)	10.887%	OK					22,65,139.28	42,21,852
47	Mode share of IPT trips (trip length >10km)	5.964%	OK		Census			7,75,605.08	
48	Mode share of Bus trips (trip length >10km)	23.397%	OK					5,83,308.18	
								20,53,611.08	
	INTER CITY TRIPS (MODE SHARE)							56,77,663.60	
49	Mode share of IPT trips (trip length <=10km)	6.715%	OK						
50	Mode share of Bus trips (trip length <=10km)	8.795%	OK						
51	Mode share of IPT trips (trip length >10km)	5.858%	OK		Census				
52	Mode share of Bus trips (trip length >10km)	23.032%	OK						
	NATURE OF tourist TRIPS								
53	Tourist trips as percent of non work same day trips	0.68%	OK						
54	Tourist trips as percent of non work overnight trips	0.68%	OK						
55	Tourist trips as percent of non work Foreign trips	100.00%	OK						
56	Percent of inter city trips >10km originating from urban area	10%	OK						
	STU DATA								
	Data Year	2017	OK						66.95
57	No. of daily intra city STU pass. trips	201561	OK		cal				6695000
58	No. of daily inter city STU pass. trips	6493439	OK		cal			Intra %	201561.39
59	Total number of intra city routes operated daily	94.00	OK		cal			Inter %	6493438.607
60	Average route length of intra city routes (km)	15.99	OK		10yrs data				6695000.00
61	Total number of (bus) trips (one way) on intra city routes	3744.00	OK		cal				18765
62	Total number of inter city routes operated daily	18671.00	OK		cal			Intra %	565
63	Average route length of inter city routes (km)	56.25	OK		10yrs data			Inter %	18200
64	Total number of (bus) trips (one way) on inter city routes	1,01,256.00	OK		cal				18765.00
65	Intra city average occupancy (% of seating capacity)	70.00%	OK		Assumed				105000
66	Inter city average occupancy (% of seating capacity)	70.00%	OK					Intra %	3161
	GROWTH RATES							Inter %	101839
	Item	Value	Error Check						
67	Average annual urban population growth rate	0.0212	OK						
68	Average annual rural population growth rate	0.0099	OK						18671
69	Expected average tourism growth rate over next 30 years	0.1113	OK		Ministry of Toursim(GOI)	0.1113	11.13		
									Inter
70	Current Intra City average staff per bus for the STU	6.240			10yrs data			Buses	18073
71	Current Inter City average staff per bus for the STU	6.240			Recent Data			Route	18671.00
	Cost and Earning							561	6
	Item	Value						93.5	1
72	Earning per km Intracity	36.000						94	Intra city routes
73	Earnings per Pass (Intra City)	10.690						18671	Inter city routes
74	Ticket price per km (Intra City)	1.430						0.967971721	
75	Average per passenger in km revenue (Intra City)								
76	Operating cost per km (Intra city)	36.710							
77	Earning per km Inter city	34.110							
78	Earnings per Pass (Inter City)	29.917							
79	Average per passenger in km revenue (Inter City)	1.126							
80	Average per passenger in km revenue (Inter City)								
81	Cost per km (Intercity)	36.710							
82	average ticket price (intercity)	Rs. 1.44							
83	average ticket price (intracity)	Rs. 1.43							

10.6.2 Current mode share scenario

	CURRENT YEAR								
S.No	Item	Value	Error Check						
1	Current Year	2018	OK						
	FLEET DETAILS								
		Bus Type 1	Error Check	Bus Type 2	Error Check	Bus Type 3	Error Check	Total	Average seating capacity
	Item	Mini/ Midi buses		Regular Buses		Luxury Coaches			
2	Current Intra City Bus Fleet	0	ERROR	561	OK	0	ERROR	561	
3	Current Intra City per bus seating Capacity	0	ERROR	44	OK	0	ERROR		44
4	Current Inter City Bus Fleet	507	OK	17439	OK	127	OK	18073	
5	Current Inter City per bus seating capacity	31	OK	43.48237	OK	49	OK		43.17097607
								18634	
	FLEET UTILIZATION AND OPERATIONAL EFFICIENCY								
	Item	Value (%)	Error Check						
6	Current year fleet utilization (Intra City)	90%	OK						
7	Current year fleet utilization (Inter City)	90%	OK						
8	Current year operational efficiency (Intra City)	99%	OK						
9	Current year operational efficiency (Inter City)	99%	OK						
	FLEET AGE								
	Item	Value (%)	Error Check						
	INTRA CITY FLEET	Mini/ Midi buses		Regular Buses		Luxury Coaches			
10	Percent of fleet size with age <=1 year	0%	ERROR	4%	OK	0%	ERROR		
11	Precent of fleet size with age >1 to 2 years	0%	ERROR	9%	OK	0%	ERROR		
12	Precent of fleet size with age >2 to 3 years	0%	ERROR	4%	OK	0%	ERROR		
13	Precent of fleet size with age >3 to 4 years	0%	ERROR	8%	OK	0%	ERROR		
14	Precent of fleet size with age >4 to 5 years	0%	ERROR	16%	OK	0%	ERROR		
15	Precent of fleet size with age >5 to 6 years	0%	ERROR	12%	OK	0%	ERROR		
16	Precent of fleet size with age >6 to 7 years	0%	ERROR	14%	OK	0%	ERROR		
17	Precent of fleet size with age >7 to 8 years	0%	ERROR	16%	OK	0%	ERROR		
18	Precent of fleet size with age >8 years	0%	ERROR	17%	OK	0%	ERROR		
	Total	0%		100%		0%			

	INTER CITY FLEET	Mini/ Midi buses		Regular Buses		Luxury Coaches		
19	Percent of fleet size with age <=1 year	0%	OK	4%	OK	19%	OK	
20	Precent of fleet size with age >1 to 2 years	0%	OK	10%	OK	54%	OK	
21	Precent of fleet size with age >2 to 3 years	0%	OK	4%	OK	0%	OK	
22	Precent of fleet size with age >3 to 4 years	0%	OK	9%	OK	0%	OK	
23	Precent of fleet size with age >4 to 5 years	0%	OK	17%	OK	0%	OK	
24	Precent of fleet size with age >5 to 6 years	100%	OK	13%	OK	13%	OK	
25	Precent of fleet size with age >6 to 7 years	0%	OK	14%	OK	14%	OK	
26	Precent of fleet size with age >7 to 8 years	0%	OK	11%	OK	0%	OK	
27	Precent of fleet size with age >8 years	0%	OK	18%	OK	0%	OK	
	Total	100%		100%		100%		
	TRIP AND CITY PROFILE DATA (CENSUS AND OTHER REPORTS)							
	Item	Value (no. of trips)	Error Check					
28	Data Year	2011	OK					
29	Total urban population	5,08,18,259	OK		Census			
30	Total rural population	6,15,56,074	OK					
	NO. OF TRIPS (TOTAL DAILY WORK TRIPS)							
31	Total daily intra city trips from urban area (<=10km)	2,08,05,642	OK	0.86				
32	Total daily intra city trips from urban areas (>10km)	33,14,967	OK		Census			
33	Total daily inter city trips from rural areas (<10km)	66,31,986	OK	0.43				
34	Total daily inter city trips from rural areas (>=10km)	89,16,293	OK					
	NO. OF TRIPS (TOTAL EDUCATION TRIPS)							
35	Total daily intra city trips from urban area	1,97,91,269	OK					
36	Total daily inter city trips from rural areas	1,27,57,562	OK					
	NO. OF BUS TRIPS (TOTAL DAILY NON WORK TRIPS) Intra + Inter city							
37	Daily same day trips	40,80,376	OK					
38	Daily overnight trips	1,41,464	OK					
39	Daily Foreign trips	13	OK					
	NO. OF IPT TRIPS (TOTAL DAILY NON WORK TRIPS) Intra + Inter city							
40	Daily same day trips	15,68,982	OK					
41	Daily overnight trips	49,718	OK					
42	Daily trips by foreign visitors	23,472	OK					
	AVERAGE TRIP LENGTH							
	Item	Value (Km)	Error Check					
43	Average trip length of intra city trips	7.48	OK					
44	Average trip length on inter city trips	26.57	OK		Census			
	Item	Value (%)	Error Check					
	INTRA CITY TRIPS (MODE SHARE) Wprl Trips							
45	Mode share of IPT trips (trip length <=10km)	5.013%	OK					Work Tips
46	Mode share of Bus trips (trip length <=10km)	10.887%	OK					22,65,139.28
47	Mode share of IPT trips (trip length >10km)	5.964%	OK		Census			7,75,605.08
48	Mode share of Bus trips (trip length >10km)	23.397%	OK					5,83,308.18
								20,53,611.08
	INTER CITY TRIPS (MODE SHARE)							56,77,663.60
49	Mode share of IPT trips (trip length <=10km)	6.715%	OK					
50	Mode share of Bus trips (trip length <=10km)	8.795%	OK					
51	Mode share of IPT trips (trip length >10km)	5.858%	OK		Census			
52	Mode share of Bus trips (trip length >10km)	23.032%	OK					
	NATURE OF tourist TRIPS							
53	Tourist trips as percent of non work same day trips	0.68%	OK					
54	Tourist trips as percent of non work overnight trips	0.68%	OK					
55	Tourist trips as percent of non work Foreign trips	100.00%	OK					
56	Percent of inter city trips >10km originating from urban area	10%	OK					
	STU DATA							
	Data Year	2017	OK					
57	No. of daily intra city STU pass. trips	201561	OK		cal			
58	No. of daily inter city STU pass. trips	6493439	OK		cal			Intra %
59	Total number of intra city routes operated daily	94.00	OK		cal			Inter %
60	Average route length of intra city routes (km)	15.99	OK		10yrs data			
61	Total number of (bus) trips (one way) on intra city routes	3744.00	OK		cal			
62	Total number of inter city routes operated daily	18671.00	OK		cal			Intra %
63	Average route length of inter city routes (km)	56.25	OK		10yrs data			Inter %
64	Total number of (bus) trips (one way) on inter city routes	1,01,256.00	OK		cal			
65	Intra city average occupancy (% of seating capacity)	70.00%	OK		Assumed			
66	Inter city average occupancy (% of seating capacity)	70.00%	OK					Intra %
	GROWTH RATES							Inter %
	Item	Value	Error Check					
67	Average annual urban population growth rate	0.0212	OK					
68	Average annual rural population growth rate	0.0099	OK					
69	Expected average tourism growth rate over next 30 years	0.1113	OK		Ministry of Toursim(GOI)	0.1113	11.13	
70	Current Intra City average staff per bus for the STU	6.240			10yrs data			Buses
71	Current Inter City average staff per bus for the STU	6.240			Recent Data			Route

	Cost and Earning							561
	Item	Value						93.5
72	Earning per km Intracity	36.000						94
73	Earnings per Pass (Intra City)	10.690						18671
74	Ticket price per km (Intra City)	1.430						0.967971721
75	Average per passenger in km revenue (Intra City)							
76	Operating cost per km (Intra city)	36.710						
77	Earning per km Inter city	34.110						
78	Earnings per Pass (Inter City)	29.917						
79	Average per passenger in km revenue (Inter City)	1.126						
80	Average per passenger in km revenue (Inter City)							
81	Cost per km (Intercity)	36.710						
82	average ticket price (intercity)	Rs. 1.44						
83	average ticket price (intracity)	Rs. 1.43						

10.6.3 Desirable scenario

	CURRENT YEAR								
S.No	Item	Value	Error Check						
1	Current Year	2018	OK						
	FLEET DETAILS								
		Bus Type 1	Error Check	Bus Type 2	Error Check	Bus Type 3	Error Check	Total	Average seating capacity
	Item	Mini/ Midi buses		Regular Buses		Luxury Coaches			
2	Current Intra City Bus Fleet	0	ERROR	561	OK	0	ERROR	561	
3	Current Intra City per bus seating Capacity	0	ERROR	44	OK	0	ERROR		44
4	Current Inter City Bus Fleet	507	OK	17439	OK	127	OK	18073	
5	Current Inter City per bus seating capacity	31	OK	43.48237	OK	49	OK		43.17097607
								18634	
	FLEET UTILIZATION AND OPERATIONAL EFFICIENCY								
	Item	Value (%)	Error Check						
6	Current year fleet utilization (Intra City)	90%	OK						
7	Current year fleet utilization (Inter City)	90%	OK						
8	Current year operational efficiency (Intra City)	99%	OK						
9	Current year operational efficiency (Inter City)	99%	OK						
	FLEET AGE								
	Item	Value (%)	Error Check						
	INTRA CITY FLEET	Mini/ Midi buses		Regular Buses		Luxury Coaches			
10	Percent of fleet size with age <=1 year	0%	ERROR	4%	OK	0%	ERROR		
11	Precent of fleet size with age >1 to 2 years	0%	ERROR	9%	OK	0%	ERROR		
12	Precent of fleet size with age >2 to 3 years	0%	ERROR	4%	OK	0%	ERROR		
13	Precent of fleet size with age >3 to 4 years	0%	ERROR	8%	OK	0%	ERROR		
14	Precent of fleet size with age >4 to 5 years	0%	ERROR	16%	OK	0%	ERROR		
15	Precent of fleet size with age >5 to 6 years	0%	ERROR	12%	OK	0%	ERROR		
16	Precent of fleet size with age >6 to 7 years	0%	ERROR	14%	OK	0%	ERROR		
17	Precent of fleet size with age >7 to 8 years	0%	ERROR	16%	OK	0%	ERROR		
18	Precent of fleet size with age >8 years	0%	ERROR	17%	OK	0%	ERROR		
	Total	0%		100%		0%			
	INTER CITY FLEET	Mini/ Midi buses		Regular Buses		Luxury Coaches			
19	Percent of fleet size with age <=1 year	0%	OK	4%	OK	19%	OK		
20	Precent of fleet size with age >1 to 2 years	0%	OK	10%	OK	54%	OK		
21	Precent of fleet size with age >2 to 3 years	0%	OK	4%	OK	0%	OK		
22	Precent of fleet size with age >3 to 4 years	0%	OK	9%	OK	0%	OK		
23	Precent of fleet size with age >4 to 5 years	0%	OK	17%	OK	0%	OK		
24	Precent of fleet size with age >5 to 6 years	100%	OK	13%	OK	13%	OK		
25	Precent of fleet size with age >6 to 7 years	0%	OK	14%	OK	14%	OK		
26	Precent of fleet size with age >7 to 8 years	0%	OK	11%	OK	0%	OK		
27	Precent of fleet size with age >8 years	0%	OK	18%	OK	0%	OK		
	Total	100%		100%		100%			
	TRIP AND CITY PROFILE DATA (CENSUS AND OTHER REPORTS)								
	Item	Value (no. of trips)	Error Check						
28	Data Year	2011	OK						Population - 2011
									50818259
29	Total urban population	5,08,18,259	OK		Census				61556074
30	Total rural population	6,15,56,074	OK						112374333
	NO. OF TRIPS (TOTAL DAILY WORK TRIPS)								
31	Total daily intra city trips from urban area (<=10km)	2,08,05,642	OK	0.86					Trip rate
32	Total daily intra city trips from urban areas (>10km)	33,14,967	OK		Census				**2.5**
33	Total daily inter city trips from rural areas (<10km)	66,31,986	OK	0.43					Work trips
34	Total daily inter city trips from rural areas (>=10km)	89,16,293	OK						3,96,68,888
									Educational trips
	NO. OF TRIPS (TOTAL EDUCATION TRIPS)								3,25,48,832
35	Total daily intra city trips from urban area	1,97,91,269	OK						
36	Total daily inter city trips from rural areas	1,27,57,562	OK						
	NO. OF BUS TRIPS (TOTAL DAILY NON WORK TRIPS) Intra + Inter city								Non work trips by Bus
37	Daily same day trips	40,80,376	OK						42,21,852
38	Daily overnight trips	1,41,464	OK						
39	Daily Foreign trips	13	OK						
	NO. OF IPT TRIPS (TOTAL DAILY NON WORK TRIPS) Intra + Inter city								Non work trips by IPT
40	Daily same day trips	15,68,982	OK						16,42,172
41	Daily overnight trips	49,718	OK						7,80,81,744
42	Daily trips by foreign visitors	23,472	OK						

	AVERAGE TRIP LENGTH								
	Item	Value (Km)	Error Check						
43	Average trip length of intra city trips	7.48	OK						
44	Average trip length on inter city trips	26.57	OK		Census				
	Item	Value (%)	Error Check						
	INTRA CITY TRIPS (MODE SHARE) Wprl Trips								
45	Mode share of IPT trips (trip length <=10km)	5.013%	OK					Work Tips	Non Work Trips
46	Mode share of Bus trips (trip length <=10km)	10.887%	OK					22,65,139.28	42,21,852
47	Mode share of IPT trips (trip length >10km)	5.964%	OK		Census			7,75,605.08	
48	Mode share of Bus trips (trip length >10km)	23.397%	OK					5,83,308.18	
								20,53,611.08	
	INTER CITY TRIPS (MODE SHARE)							56,77,663.60	
49	Mode share of IPT trips (trip length <=10km)	6.715%	OK						
50	Mode share of Bus trips (trip length <=10km)	8.795%	OK						
51	Mode share of IPT trips (trip length >10km)	5.858%	OK		Census				
52	Mode share of Bus trips (trip length >10km)	23.032%	OK						
	NATURE OF tourist TRIPS								
53	Tourist trips as percent of non work same day trips	0.68%	OK						
54	Tourist trips as percent of non work overnight trips	0.68%	OK						
55	Tourist trips as percent of non work Foreign trips	100.00%	OK						
56	Percent of inter city trips >10km originating from urban area	10%	OK						
	STU DATA								
	Data Year	2017	OK						66.95
57	No. of daily intra city STU pass. trips	201561	OK		cal				6695000
58	No. of daily inter city STU pass. trips	6493439	OK		cal			Intra %	201561.39
59	Total number of intra city routes operated daily	94.00	OK		cal			Inter %	6493438.607
60	Average route length of intra city routes (km)	15.99	OK		10yrs data				6695000.00
61	Total number of (bus) trips (one way) on intra city routes	3744.00	OK		cal				18765
62	Total number of inter city routes operated daily	18671.00	OK		cal			Intra %	565
63	Average route length of inter city routes (km)	56.25	OK		10yrs data			Inter %	18200
64	Total number of (bus) trips (one way) on inter city routes	1,01,256.00	OK		cal				18765.00
65	Intra city average occupancy (% of seating capacity)	70.00%	OK		Assumed				105000
66	Inter city average occupancy (% of seating capacity)	70.00%	OK					Intra %	3161
	GROWTH RATES							Inter %	101839
	Item	Value	Error Check						
67	Average annual urban population growth rate	0.0212	OK						
68	Average annual rural population growth rate	0.0099	OK						18671
69	Expected average tourism growth rate over next 30 years	0.1113	OK		Ministry of Toursim(GOI)	0.1113	11.13		
									Inter
70	Current Intra City average staff per bus for the STU	6.240			10yrs data			Buses	18073
71	Current Inter City average staff per bus for the STU	6.240			Recent Data			Route	18671.00
	Cost and Earning							561	6
	Item	Value						93.5	1
72	Earning per km Intracity	36.000						94	Intra city routes
73	Earnings per Pass (Intra City)	10.690						18671	Inter city routes
74	Ticket price per km (Intra City)	1.430						0.967971721	
75	Average per passenger in km revenue (Intra City)								
76	Operating cost per km (Intra city)	36.710							
77	Earning per km Inter city	34.110							
78	Earnings per Pass (Inter City)	29.917							
79	Average per passenger in km revenue (Inter City)	1.126							
80	Average per passenger in km revenue (Inter City)								
81	Cost per km (Intercity)	36.710							
82	average ticket price (intercity)	Rs. 1.44							
83	average ticket price (intracity)	Rs. 1.43							

10.7 Tool default values

10.7.1 Business as usual scenario

S.N0.	Item	Value	Unit	Error Check	Source
1	Expected annual improvement in fleet utilization (if current <90%) - Intra City	0.00%	Percent	OK	1%
2	Expected annual improvement in fleet utilization (if current <99%) - Intra City	0.00%	Percent	OK	0.10%
3	Expected annual improvement in fleet utilization (if current >=99%) - Intra City	0.0%	Percent	OK	
4	Expected annual improvement in fleet utilization (if current <90%) - Inter City	0.0%	Percent	OK	1%
5	Expected annual improvement in fleet utilization (if current <99%) - Inter City	0.00%	Percent	OK	0.10%
6	Expected annual improvement in fleet utilization (if current >=99%) - Inter City	0.0%	Percent	OK	
7	Annual expected improvement in operational efficiency 'GAP' (other than fleet utilization) - Intra City	9.00%	Percent	OK	10%
8	Annual expected improvement in operational efficiency 'GAP' (other than fleet utilization) - Inter City	9.00%	Percent	OK	10%
9	Average annual increase in income levels	9%	Percent	OK	
10	Average expected life of a Type 1 - Intra City Bus	10	Years	OK	
11	Average expected life of a Type 2 - Intra City Bus	10	Years	OK	
12	Average expected life of a Type 3 - Intra City Bus	10	Years	OK	
13	Average expected life of a Type 1 - Inter City Bus	10	Years	OK	
14	Average expected life of a Type 2 - Inter City Bus	10	Years	OK	
15	Average expected life of a Type 3 - Inter City Bus	10	Years	OK	
16	Achievable target mode share (Intra City Trips) - IPT for less than 10km trip length	5.61%	Percent	OK	30.00%
17	Achievable target mode share (Intra City Trips) - STU Bus for less than 10km trip length	0.00%	Percent	OK	29.00%
18	Achevable target mode share (Intra City Trips) - Other Bus for less than 10km trip length	16.19%	Percent	OK	1.00%
19	Achevable target mode share (Intra City Trips) - IPT for more than 10km trip length	25.58%	Percent	OK	25.00%
20	Achevable target mode share (Intra City Trips) - STU Bus for More than 10km trip length	0.00%	Percent	OK	47.00%
21	Achevable target mode share (Intra City Trips) - Other Bus for More than 10km trip length	24.59%	Percent	OK	3.00%
22	Achevable target mode share (Inter City Trips) - IPT for less than 10km trip length	0.00%	Percent	OK	30.00%
23	Achevable target mode share (Inter City Trips) - STU Bus for less than 10km trip length	28.89%	Percent	OK	19.50%
24	Achevable target mode share (Inter City Trips) - Other Bus for less than 10km trip length	0.00%	Percent	OK	0.50%
25	Achevable target mode share (Inter City Trips) - IPT for More than 10km trip length	2.71%	Percent	OK	10.00%
26	Achevable target mode share (Inter City Trips) - STU Bus for More than 10km trip length	64.63%	Percent	OK	72.00%
27	Achevable target mode share (Inter City Trips) - Other Bus for More than 10km trip length	2.26%	Percent	OK	8.00%
28	Annual rate of Change (Intra City Trips) - IPT for less than 10km trip length	0.00%	Percent	OK	
29	Annual rate of change (Intra City Trips) - STU Bus for less than 10km trip length	66.00%	Percent	OK	
30	Annual rate of change (Intra City Trips) - OTHER Bus for less than 10km trip length	66.00%	Percent	OK	

31	Annual Rate of change (Intra City Trips) - IPT for more than 10km trip length	0.00%	Percent	OK
32	Annual rate of change (Intra City Trips) - STU Bus for More than 10km trip length	66.00%	Percent	OK
33	Annual rate of change (Intra City Trips) - OTHER Bus for More than 10km trip length	66.00%	Percent	OK
34	Annual rate of change (Inter City Trips) - IPT for less than 10km trip length	0.00%	Percent	OK
35	Annual rate of change (Inter City Trips) - STU Bus for less than 10km trip length	0.40%	Percent	OK
36	Annual rate of change (Inter City Trips) - OTHER Bus for less than 10km trip length	0.40%	Percent	OK
37	Annual rate of change (Inter City Trips) - IPT for More than 10km trip length	0.00%	Percent	OK
38	Annual rate of change (Inter City Trips) - STU Bus for More than 10km trip length	0.40%	Percent	OK
39	Annual rate of change (Inter City Trips) - OTHER Bus for More than 10km trip length	0.40%	Percent	OK
40	Percent of same day non work trips from within state	96.00%	Percent	OK
41	Percent of overnight non work trips from within state	15.00%	Percent	OK
42	Percent of same day non work trips less than 10km	60.00%	Percent	OK
43	Percent of overnight non work trips from within state	33.00%	Percent	OK
44	Percent of overnight non work trips less than 10km	0.00%	Percent	OK
45	Percent of same day non work trips by city bus	22.50%	Percent	OK
46	Percent of same day non work trips by intercity bus	22.50%	Percent	OK
47	Percent of overnight non work trips by city bus	1.00%	Percent	OK
48	Percent of overnight non work trips by intercity bus	22.50%	Percent	OK
49	Percent non-work trips that are intra-city	48.00%	Percent	OK
50	Intra city non work trips <10km by bus	39.90%		
51	Intra city non work trips >10km by bus	13.66%		
52	Inter city non work trips <10km by bus	10.27%		
53	Inter city non work trips >10km by bus	36.17%		
54	Intra city non work trips <10km by IPT	47.23%		
55	Intra city non work trips >10km by IPT	8.95%		
56	Inter city non work trips <10km by IPT	20.17%		
57	Inter city non work trips >10km by IPT	23.65%		
58	Perscent of STU Intra city trips <10km as percent of total intra city non work trips by bus	86.26%		
59	Perscent of STU Intra city trips >10km as percent of total intra city non work trips by bus	13.74%		
60	Perscent of STU Inter city trips <10km as percent of total intra city non work trips by bus	43.00%		
61	Perscent of STU Inter city trips >10km as percent of total intra city non work trips by bus	57.0%		100.00%
62	Percent of same day education trips less than 10km in urban areas	85.00%	Percent	OK
63	Percent of same day education trips less than 10km by public buses in urban areas	14.52%	Percent	OK
64	Percent of same day education trips less than 10km by IPT in urban areas	4.00%	Percent	OK
65	Percent of same day education trips more than 10km by public buses in urban areas	21.00%	Percent	OK
66	Percent of same day education trips more than 10km by IPT in urban areas	15.00%	Percent	OK
67	Percent of same day education trips less than 10km in rural areas	70.00%	Percent	OK
68	Percent of same day education trips less than 10km by public buses in rural areas	20.00%	Percent	OK
69	Percent of same day education trips less than 10km by IPT in rural areas	0.50%	Percent	OK
70	Percent of same day education trips more than 10km by public buses in rural areas	97.00%	Percent	OK
71	Percent of same day education trips more than 10km by IPT in rural areas	4.00%	Percent	OK
72	Non Work bus trips origin from State (travelling outside state) as percent of non-work bus trips in state	5.00%	Percent	OK
73	Non-work IPT trips origin from State (travelling outside state) as percent of Non-work IPT trips in state	5.00%	Percent	OK
74	Work bus trips origin from other states (travelling to state) as percent of work bus trips in state	1.00%	Percent	OK
75	Work IPT trips origin from outside state (travelling to state) as percent of work IPT trips in state	1.00%	Percent	OK
76	Desired/Target Average occupancy as percent of average seating capacity (Intra City buses)	70.00%	Percent	OK
77	Desired/Target Average occupancy as percent of average seating capacity (Inter City buses)	70.00%	Percent	OK
78	Ultimate achievable intra city trip length (pass trip length)	7.48	km	OK
79	Expected annual percent change in Intra city trip length	0.00%	Percent	OK
80	Ultimate achievable average inter city trip length	26.57	km	OK
81	Expected annual percent change in intercity trip length	0.00%	Percent	OK
82	Ultimate achievable average number of intra city trips per bus per day	6.67		OK
83	Expected change in average number of intra city trips per bus per day	0.00%	Percent	OK
84	Ultimate achievable average number of inter city trips per bus per day	6.23		OK
85	Expected change in average number of inter city trips per bus per day	0.00%	Percent	OK
86	Expected maximum average route length for Intra city trips	15.99	km	OK
87	Expected annual change in average intra city route length	0.00%	Percent	OK
88	Expected maximum average intercity route length	56.25	km	OK
89	Expected annual change in average inter city route length	0.00%	Percent	OK

90	Average Cost of Intra City Bus Type 1	18,00,000	Rs	OK
91	Average Cost of Intra City Bus Type 2	28,00,000	Rs	OK
92	AverageCost of Intra City Bus Type 3	65,00,000	Rs	OK
93	Average Cost of Inter City Bus Type 1	18,00,000	Rs	OK
94	Average Cost of Inter City Bus Type 2	28,00,000	Rs	OK
95	AverageCost of Inter City Bus Type 3	40,00,000	Rs	OK
96	Average expected revenue from scrapping of Intra City Mini Bus	2,00,000	Rs	OK
97	Average expected revenue from scrapping of Intra City Regular Bus	4,00,000	Rs	OK
98	Average expected revenue from scrapping of Intra City Luxury Coach	8,00,000	Rs	OK
99	Average expected revenue from scrapping of Inter City Mini Bus	2,00,000	Rs	OK
100	Average expected revenue from scrapping of Inter City Regular Bus	4,00,000	Rs	OK
101	Average expected revenue from scrapping of Inter City Luxury Coach	8,00,000	Rs	OK
102	Land Required per bus for intra city depot development	160.00	sqm	OK
103	Land Required per bus for inter city depot development	160.00	sqm	OK
104	Land Required per bus for intra city terminal development	14.00	sqm	OK
105	Land Required per bus for inter city terminal development	70.00	sqm	OK
106	Cost per bus for developing intra city depot	8,00,000	Rs.	OK
107	Cost per bus for developing Inter city depot	8,00,000	Rs.	OK
108	Cost per bus for developing intra city terminal	2,50,000	Rs.	OK
109	Cost per bus for developing Inter City Terminal	2,50,000	Rs.	OK
110	Average intra city depot capacity	100.00	Buses	OK
111	Average Inter City Depot Capacity	100.00	Buses	OK
112	Average Intra city terminal capacity	20.00	Bays	OK
113	Average Inter city terminal capacity	40.00	Bays	OK
114	Factor to relate Intra city terminal capacity to bus fleet (Fleet/(Capacity*X), where X=)	12.00		OK
115	Factor to relate Inter city terminal capacity to bus fleet (Fleet/(Capacity*X), where X=)	1.25		OK
116	% of non local STU buses using inter city terminal (as % of STU buses)	5%	%	OK
		Current (%)	Proposed (%)	Error Check
		x		OK
	INTRA CITY			
117	Mini/ Midi buses	0.00%	21%	
118	Regular Buses	100.00%	74%	
119	Luxury Coaches	0.00%	5%	OK
	INTER CITY			
120	Mini/ Midi buses	2.81%	20%	
121	Regular Buses	96.49%	75%	
122	Luxury Coaches	0.70%	5%	OK
123	Average Intra City Seating Capacity	44	32.56	
124	Average Inter City Seating Capacity	43.17097607	41.2617775	
125	Rate of change of occupancy % as % of gap (Intra City buses)	0.00%	Percent	OK
126	Rate of change of occupancy % as % of gap (Inter City buses)	0.00%	Percent	OK
127	Target/intended average staff number for each bus (Intra City)	6.24	Number	OK
128	Expected annual percentage change in staff to bus ration (Intra City)	10%	Percent	OK
129	Target/intended average staff number for each bus (Inter City)	6.24	Number	OK
130	Expected annual percentage change in staff to us ration (Inter City)	10%	Percent	OK
131	Target Operational Efficiency Intra City	102%		
132	Target Operational Efficency Inter City	102%		
133	Target Intra city buses per route	15		
134	Average annual rate of change of (as percent of current ratio) of Intra buses per route	0.01%	Percent	OK
135	Target Inter city buses per route	0.075		
136	Average annual rate of change of (as percent of current ratio) of Intra buses per route	0.03%	Percent	OK
137	Current average operational hours - Intra City	16	Hours	
138	Current average operational hours - Inter City	14	Hours	
139	Average staff salary Intercity (per month)	25000	25000	
140	Average staff salary Intracity (per month)	25000		
141	current year vehicle utilization	336.26	km	
142	vehicle utilization	338	km	

10.7.2 Current mode share scenario

S.NO.	Item	Value	Unit	Error Check	Source
1	Expected annual improvement in fleet utilization (if current <90%) - Intra City	0.00%	Percent	OK	1%
2	Expected annual improvement in fleet utilization (if current <99%) - Intra City	0.00%	Percent	OK	0.10%
3	Expected annual improvement in fleet utilization (if current >=99%) - Intra City	0.0%	Percent	OK	
4	Expected annual improvement in fleet utilization (if current <90%) - Inter City	0.0%	Percent	OK	1%
5	Expected annual improvement in fleet utilization (if current <99%) - Inter City	0.00%	Percent	OK	0.10%
6	Expected annual improvement in fleet utilization (if current >=99%) - Inter City	0.0%	Percent	OK	
7	Annual expected improvement in operational efficiency 'GAP' (other than fleet utilization) - Intra City	9.00%	Percent	OK	10%
8	Annual expected improvement in operational efficiency 'GAP' (other than fleet utilization) - Inter City	9.00%	Percent	OK	10%
9	Average annual increase in income levels	9%	Percent	OK	
10	Average expected life of a Type 1 - Intra City Bus	10	Years	OK	
11	Average expected life of a Type 2 - Intra City Bus	10	Years	OK	
12	Average expected life of a Type 3 - Intra City Bus	10	Years	OK	
13	Average expected life of a Type 1 - Inter City Bus	10	Years	OK	
14	Average expected life of a Type 2 - Inter City Bus	10	Years	OK	
15	Average expected life of a Type 3 - Inter City Bus	10	Years	OK	
16	Achievable target mode share (Intra City Trips) - IPT for less than 10km trip length	5.61%	Percent	OK	30.00%
17	Achievable target mode share (Intra City Trips) - STU Bus for less than 10km trip length	0.00%	Percent	OK	29.00%
18	Achevable target mode share (Intra City Trips) - Other Bus for less than 10km trip length	16.19%	Percent	OK	1.00%
19	Achevable target mode share (Intra City Trips) - IPT for more than 10km trip length	25.58%	Percent	OK	25.00%
20	Achevable target mode share (Intra City Trips) - STU Bus for More than 10km trip length	0.00%	Percent	OK	47.00%
21	Achevable target mode share (Intra City Trips) - Other Bus for More than 10km trip length	24.59%	Percent	OK	3.00%
22	Achevable target mode share (Inter City Trips) - IPT for less than 10km trip length	9.28%	Percent	OK	30.00%
23	Achevable target mode share (Inter City Trips) - STU Bus for less than 10km trip length	14.39%	Percent	OK	19.50%
24	Achevable target mode share (Inter City Trips) - Other Bus for less than 10km trip length	2.84%	Percent	OK	0.50%
25	Achevable target mode share (Inter City Trips) - IPT for More than 10km trip length	11.63%	Percent	OK	10.00%
26	Achevable target mode share (Inter City Trips) - STU Bus for More than 10km trip length	24.13%	Percent	OK	72.00%
27	Achevable target mode share (Inter City Trips) - Other Bus for More than 10km trip length	29.76%	Percent	OK	8.00%
28	Annual rate of Change (Intra City Trips) - IPT for less than 10km trip length	0.00%	Percent	OK	
29	Annual rate of change (Intra City Trips) - STU Bus for less than 10km trip length	66.00%	Percent	OK	
30	Annual rate of change (Intra City Trips) - OTHER Bus for less than 10km trip length	66.00%	Percent	OK	
31	Annual Rate of change (Intra City Trips) - IPT for more than 10km trip length	0.00%	Percent	OK	
32	Annual rate of change (Intra City Trips) - STU Bus for More than 10km trip length	66.00%	Percent	OK	
33	Annual rate of change (Intra City Trips) - OTHER Bus for More than 10km trip length	66.00%	Percent	OK	
34	Annual rate of change (Inter City Trips) - IPT for less than 10km trip length	0.00%	Percent	ERROR	
35	Annual rate of change (Inter City Trips) - STU Bus for less than 10km trip length	0.00%	Percent	ERROR	
36	Annual rate of change (Inter City Trips) - OTHER Bus for less than 10km trip length	0.00%	Percent	ERROR	
37	Annual rate of change (Inter City Trips) - IPT for More than 10km trip length	0.00%	Percent	ERROR	
38	Annual rate of change (Inter City Trips) - STU Bus for More than 10km trip length	0.00%	Percent	ERROR	
39	Annual rate of change (Inter City Trips) - OTHER Bus for More than 10km trip length	0.00%	Percent	ERROR	
40	Percent of same day non work trips from within state	96.00%	Percent	OK	
41	Percent of overnight non work trips from within state	15.00%	Percent	OK	
42	Percent of same day non work trips less than 10km	60.00%	Percent	OK	
43	Percent of overnight non work trips from within state	33.00%	Percent	OK	
44	Percent of overnight non work trips less than 10km	0.00%	Percent	OK	
45	Percent of same day non work trips by city bus	22.50%	Percent	OK	
46	Percent of same day non work trips by intercity bus	22.50%	Percent	OK	
47	Percent of overnight non work trips by city bus	1.00%	Percent	OK	
48	Percent of overnight non work trips by intercity bus	22.50%	Percent	OK	
49	Percent non-work trips that are intra-city	48.00%	Percent	OK	
50	Intra city non work trips <10km by bus	39.90%			
51	Intra city non work trips >10km by bus	13.66%			
52	Inter city non work trips <10km by bus	10.27%			
53	Inter city non work trips >10km by bus	36.17%			
54	Intra city non work trips <10km by IPT	47.23%			
55	Intra city non work trips >10km by IPT	8.95%			
56	Inter city non work trips <10km by IPT	20.17%			
57	Inter city non work trips >10km by IPT	23.65%			
58	Perscent of STU Intra city trips <10km as percent of total intra city non work trips by bus	86.26%			
59	Perscent of STU Intra city trips >10km as percent of total intra city non work trips by bus	13.74%			
60	Perscent of STU Inter city trips <10km as percent of total intra city non work trips by bus	43.00%			
61	Perscent of STU Inter city trips >10km as percent of total intra city non work trips by bus	57.0%		100.00%	New Added 222018

62	Percent of same day education trips less than 10km in urban areas	85.00%	Percent	OK	Changed- 19/2/2018
63	Percent of same day education trips less than 10km by public buses in urban areas	14.52%	Percent	OK	
64	Percent of same day education trips less than 10km by IPT in urban areas	4.00%	Percent	OK	
65	Percent of same day education trips more than 10km by public buses in urban areas	21.00%	Percent	OK	
66	Percent of same day education trips more than 10km by IPT in urban areas	15.00%	Percent	OK	
67	Percent of same day education trips less than 10km in rural areas	70.00%	Percent	OK	
68	Percent of same day education trips less than 10km by public buses in rural areas	20.00%	Percent	OK	
69	Percent of same day education trips less than 10km by IPT in rural areas	0.50%	Percent	OK	
70	Percent of same day education trips more than 10km by public buses in rural areas	97.00%	Percent	OK	
71	Percent of same day education trips more than 10km by IPT in rural areas	4.00%	Percent	OK	NEW - added 20/12/17
72	Non Work bus trips origin from State (travelling outside state) as percent of non-work bus trips in state	5.00%	Percent	OK	
73	Non-work IPT trips origin from State (travelling outside state) as percent of Non-work IPT trips in state	5.00%	Percent	OK	
74	Work bus trips origin from other states (travelling to state) as percent of work bus trips in state	1.00%	Percent	OK	
75	Work IPT trips origin from outside state (travelling to state) as percent of work IPT trips in state	1.00%	Percent	OK	
76	Desired/Target Average occupancy as percent of average seating capacity (Intra City buses)	70.00%	Percent	OK	75.00%
77	Desired/Target Average occupancy as percent of average seating capacity (Inter City buses)	70.00%	Percent	OK	66.00%
78	Ultimate achievable intra city trip length (pass trip length)	7.48	km	OK	12.00
79	Expected annual percent change in Intra city trip length	0.00%	Percent	OK	
80	Ultimate achievable average inter city trip length	26.57	km	OK	40.00
81	Expected annual percent change in intercity trip length	0.00%	Percent	OK	
82	Ultimate achievable average number of intra city trips per bus per day	6.67		OK	
83	Expected change in average number of intra city trips per bus per day	0.00%	Percent	OK	
84	Ultimate achievable average number of inter city trips per bus per day	6.23		OK	(from FE DU 62)
85	Expected change in average number of inter city trips per bus per day	0.00%	Percent	OK	
86	Expected maximum average route length for Intra city trips	15.99	km	OK	40.00
87	Expected annual change in average intra city route length	0.00%	Percent	OK	
88	Expected maximum average intercity route length	56.25	km	OK	180.00
89	Expected annual change in average inter city route length	0.00%	Percent	OK	
90	Average Cost of Intra City Bus Type 1	18,00,000	Rs	OK	
91	Average Cost of Intra City Bus Type 2	28,00,000	Rs	OK	
92	AverageCost of Intra City Bus Type 3	65,00,000	Rs	OK	
93	Average Cost of Inter City Bus Type 1	18,00,000	Rs	OK	
94	Average Cost of Inter City Bus Type 2	28,00,000	Rs	OK	
95	AverageCost of Inter City Bus Type 3	40,00,000	Rs	OK	
96	Average expected revenue from scrapping of Intra City Mini Bus	2,00,000	Rs	OK	
97	Average expected revenue from scrapping of Intra City Regular Bus	4,00,000	Rs	OK	
98	Average expected revenue from scrapping of Intra City Luxury Coach	8,00,000	Rs	OK	
99	Average expected revenue from scrapping of Inter City Mini Bus	2,00,000	Rs	OK	
100	Average expected revenue from scrapping of Inter City Regular Bus	4,00,000	Rs	OK	
101	Average expected revenue from scrapping of Inter City Luxury Coach	8,00,000	Rs	OK	
102	Land Required per bus for intra city depot development	160.00	sqm	OK	
103	Land Required per bus for inter city depot development	160.00	sqm	OK	
104	Land Required per bus for intra city terminal development	14.00	sqm	OK	
105	Land Required per bus for inter city terminal development	70.00	sqm	OK	
106	Cost per bus for developing intra city depot	8,00,000	Rs.	OK	
107	Cost per bus for developing Inter city depot	8,00,000	Rs.	OK	
108	Cost per bus for developing intra city terminal	2,50,000	Rs.	OK	
109	Cost per bus for developing Inter City Terminal	2,50,000	Rs.	OK	
110	Average intra city depot capacity	100.00	Buses	OK	
111	Average Inter City Depot Capacity	100.00	Buses	OK	
112	Average Intra city terminal capacity	20.00	Bays	OK	
113	Average Inter city terminal capacity	40.00	Bays	OK	
114	Factor to relate Intra city terminal capacity to bus fleet (Fleet/(Capacity*X), where X=)	12.00		OK	
115	Factor to relate Inter city terminal capacity to bus fleet (Fleet/(Capacity*X), where X=)	1.25		OK	
116	% of non local STU buses using inter city terminal (as % of STU buses)	5%	%	OK	
		Current (%)	Proposed (%)	Error Check	
		x		OK	

	INTRA CITY				
117	Mini/ Midi buses	0.00%	21%		
118	Regular Buses	100.00%	74%		
119	Luxury Coaches	0.00%	5%	OK	
	INTER CITY				
120	Mini/ Midi buses	2.81%	20%		
121	Regular Buses	96.49%	75%		
122	Luxury Coaches	0.70%	5%	OK	
123	Average Intra City Seating Capacity	44	32.56		
124	Average Inter City Seating Capacity	43.17097607	41.2617775		43
125	Rate of change of occupancy % as % of gap (Intra City buses)	0.00%	Percent	OK	
126	Rate of change of occupancy % as % of gap (Inter City buses)	0.00%	Percent	OK	
127	Target/intended average staff number for each bus (Intra City)	6.24	Number	OK	
128	Expected annual percentage change in staff to bus ration (Intra City)	10%	Percent	OK	
129	Target/intended average staff number for each bus (Inter City)	6.24	Number	OK	
130	Expected annual percentage change in staff to us ration (Inter City)	10%	Percent	OK	
131	Target Operational Efficiency Intra City	102%			
132	Target Operational Efficency Inter City	102%			
133	Target Intra city buses per route	15			
134	Average annual rate of change of (as percent of current ratio) of Intra buses per route	0.01%	Percent	OK	
135	Target Inter city buses per route	0.075			
136	Average annual rate of change of (as percent of current ratio) of Intra buses per route	0.03%	Percent	OK	
137	Current average operational hours - Intra City	16	Hours		
138	Current average operational hours - Inter City	14	Hours		
139	Average staff salary Intercity (per month)	25000	25000		New 23/12/17
140	Average staff salary Intracity (per month)	25000			New 23/12/18
141	current year vehicle utilization	336.26	km		
142	vehicle utilization	338	km		

10.7.3 Desirable scenario

S.N0.	Item	Value	Unit	Error Check	Source
1	Expected annual improvement in fleet utilization (if current <90%) - Intra City	0.15%	Percent	OK	1%
2	Expected annual improvement in fleet utilization (if current <99%) - Intra City	0.15%	Percent	OK	0.10%
3	Expected annual improvement in fleet utilization (if current >=99%) - Intra City	0.15%	Percent	OK	
4	Expected annual improvement in fleet utilization (if current <90%) - Inter City	0.15%	Percent	OK	1%
5	Expected annual improvement in fleet utilization (if current <99%) - Inter City	0.15%	Percent	OK	0.10%
6	Expected annual improvement in fleet utilization (if current >=99%) - Inter City	0.15%	Percent	OK	
7	Annual expected improvement in operational efficiency 'GAP' (other than fleet utilization) - Intra City	9.00%	Percent	OK	10%
8	Annual expected improvement in operational efficiency 'GAP' (other than fleet utilization) - Inter City	9.00%	Percent	OK	10%
9	Average annual increase in income levels	9%	Percent	OK	
10	Average expected life of a Type 1 - Intra City Bus	10	Years	OK	
11	Average expected life of a Type 2 - Intra City Bus	10	Years	OK	
12	Average expected life of a Type 3 - Intra City Bus	10	Years	OK	
13	Average expected life of a Type 1 - Inter City Bus	10	Years	OK	
14	Average expected life of a Type 2 - Inter City Bus	10	Years	OK	
15	Average expected life of a Type 3 - Inter City Bus	10	Years	OK	
16	Achievable target mode share (Intra City Trips) - IPT for less than 10km trip length	5.61%	Percent	OK	30.00%
17	Achievable target mode share (Intra City Trips) - STU Bus for less than 10km trip length	0.00%	Percent	OK	29.00%
18	Achevable target mode share (Intra City Trips) - Other Bus for less than 10km trip length	16.19%	Percent	OK	1.00%
19	Achevable target mode share (Intra City Trips) - IPT for more than 10km trip length	25.58%	Percent	OK	25.00%
20	Achevable target mode share (Intra City Trips) - STU Bus for More than 10km trip length	0.00%	Percent	OK	47.00%
21	Achevable target mode share (Intra City Trips) - Other Bus for More than 10km trip length	24.59%	Percent	OK	3.00%
22	Achevable target mode share (Inter City Trips) - IPT for less than 10km trip length	0.00%	Percent	OK	30.00%
23	Achevable target mode share (Inter City Trips) - STU Bus for less than 10km trip length	28.89%	Percent	OK	19.50%
24	Achevable target mode share (Inter City Trips) - Other Bus for less than 10km trip length	0.00%	Percent	OK	0.50%
25	Achevable target mode share (Inter City Trips) - IPT for More than 10km trip length	2.71%	Percent	OK	10.00%
26	Achevable target mode share (Inter City Trips) - STU Bus for More than 10km trip length	64.63%	Percent	OK	72.00%
27	Achevable target mode share (Inter City Trips) - Other Bus for More than 10km trip length	2.26%	Percent	OK	8.00%
28	Annual rate of Change (Intra City Trips) - IPT for less than 10km trip length	0.00%	Percent	OK	
29	Annual rate of change (Intra City Trips) - STU Bus for less than 10km trip length	66.00%	Percent	OK	
30	Annual rate of change (Intra City Trips) - OTHER Bus for less than 10km trip length	66.00%	Percent	OK	

31	Annual Rate of change (Intra City Trips) - IPT for more than 10km trip length	0.00%	Percent	OK
32	Annual rate of change (Intra City Trips) - STU Bus for More than 10km trip length	66.00%	Percent	OK
33	Annual rate of change (Intra City Trips) - OTHER Bus for More than 10km trip length	66.00%	Percent	OK
34	Annual rate of change (Inter City Trips) - IPT for less than 10km trip length	0.82%	Percent	OK
35	Annual rate of change (Inter City Trips) - STU Bus for less than 10km trip length	0.82%	Percent	OK
36	Annual rate of change (Inter City Trips) - OTHER Bus for less than 10km trip length	0.82%	Percent	OK
37	Annual rate of change (Inter City Trips) - IPT for More than 10km trip length	0.82%	Percent	OK
38	Annual rate of change (Inter City Trips) - STU Bus for More than 10km trip length	0.82%	Percent	OK
39	Annual rate of change (Inter City Trips) - OTHER Bus for More than 10km trip length	0.82%	Percent	OK
40	Percent of same day non work trips from within state	96.00%	Percent	OK
41	Percent of overnight non work trips from within state	15.00%	Percent	OK
42	Percent of same day non work trips less than 10km	60.00%	Percent	OK
43	Percent of overnight non work trips from within state	33.00%	Percent	OK
44	Percent of overnight non work trips less than 10km	0.00%	Percent	OK
45	Percent of same day non work trips by city bus	22.50%	Percent	OK
46	Percent of same day non work trips by intercity bus	22.50%	Percent	OK
47	Percent of overnight non work trips by city bus	1.00%	Percent	OK
48	Percent of overnight non work trips by intercity bus	22.50%	Percent	OK
49	Percent non-work trips that are intra-city	48.00%	Percent	OK
50	Intra city non work trips <10km by bus	39.90%		
51	Intra city non work trips >10km by bus	13.66%		
52	Inter city non work trips <10km by bus	10.27%		
53	Inter city non work trips >10km by bus	36.17%		
54	Intra city non work trips <10km by IPT	47.23%		
55	Intra city non work trips >10km by IPT	8.95%		
56	Inter city non work trips <10km by IPT	20.17%		
57	Inter city non work trips >10km by IPT	23.65%		
58	Perscent of STU Intra city trips <10km as percent of total intra city non work trips by bus	86.26%		
59	Perscent of STU Intra city trips >10km as percent of total intra city non work trips by bus	13.74%		
60	Perscent of STU Inter city trips <10km as percent of total intra city non work trips by bus	43.00%		
61	Perscent of STU Inter city trips >10km as percent of total intra city non work trips by bus	57.0%		100.00%
62	Percent of same day education trips less than 10km in urban areas	85.00%	Percent	OK
63	Percent of same day education trips less than 10km by public buses in urban areas	14.52%	Percent	OK
64	Percent of same day education trips less than 10km by IPT in urban areas	4.00%	Percent	OK
65	Percent of same day education trips more than 10km by public buses in urban areas	21.00%	Percent	OK
66	Percent of same day education trips more than 10km by IPT in urban areas	15.00%	Percent	OK
67	Percent of same day education trips less than 10km in rural areas	70.00%	Percent	OK
68	Percent of same day education trips less than 10km by public buses in rural areas	20.00%	Percent	OK
69	Percent of same day education trips less than 10km by IPT in rural areas	0.50%	Percent	OK
70	Percent of same day education trips more than 10km by public buses in rural areas	97.00%	Percent	OK
71	Percent of same day education trips more than 10km by IPT in rural areas	4.00%	Percent	OK
72	Non Work bus trips origin from State (travelling outside state) as percent of non-work bus trips in state	5.00%	Percent	OK
73	Non-work IPT trips origin from State (travelling outside state) as percent of Non-work IPT trips in state	5.00%	Percent	OK
74	Work bus trips origin from other states (travelling to state) as percent of work bus trips in state	1.00%	Percent	OK
75	Work IPT trips origin from outside state (travelling to state) as percent of work IPT trips in state	1.00%	Percent	OK
76	Desired/Target Average occupancy as percent of average seating capacity (Intra City buses)	74.00%	Percent	OK
77	Desired/Target Average occupancy as percent of average seating capacity (Inter City buses)	74.00%	Percent	OK
78	Ultimate achievable intra city trip length (pass trip length)	7.48	km	OK
79	Expected annual percent change in Intra city trip length	0.00%	Percent	OK
80	Ultimate achievable average inter city trip length	26.57	km	OK
81	Expected annual percent change in intercity trip length	0.00%	Percent	OK
82	Ultimate achievable average number of intra city trips per bus per day	6.67		OK
83	Expected change in average number of intra city trips per bus per day	0.00%	Percent	OK
84	Ultimate achievable average number of inter city trips per bus per day	6.23		OK
85	Expected change in average number of inter city trips per bus per day	0.00%	Percent	OK
86	Expected maximum average route length for Intra city trips	15.99	km	OK
87	Expected annual change in average intra city route length	0.00%	Percent	OK
88	Expected maximum average intercity route length	75.00	km	OK
89	Expected annual change in average inter city route length	0.90%	Percent	OK

90	Average Cost of Intra City Bus Type 1	18,00,000	Rs	OK
91	Average Cost of Intra City Bus Type 2	28,00,000	Rs	OK
92	AverageCost of Intra City Bus Type 3	65,00,000	Rs	OK
93	Average Cost of Inter City Bus Type 1	18,00,000	Rs	OK
94	Average Cost of Inter City Bus Type 2	28,00,000	Rs	OK
95	AverageCost of Inter City Bus Type 3	40,00,000	Rs	OK
96	Average expected revenue from scrapping of Intra City Mini Bus	2,00,000	Rs	OK
97	Average expected revenue from scrapping of Intra City Regular Bus	4,00,000	Rs	OK
98	Average expected revenue from scrapping of Intra City Luxury Coach	8,00,000	Rs	OK
99	Average expected revenue from scrapping of Inter City Mini Bus	2,00,000	Rs	OK
100	Average expected revenue from scrapping of Inter City Regular Bus	4,00,000	Rs	OK
101	Average expected revenue from scrapping of Inter City Luxury Coach	8,00,000	Rs	OK
102	Land Required per bus for intra city depot development	160.00	sqm	OK
103	Land Required per bus for inter city depot development	160.00	sqm	OK
104	Land Required per bus for intra city terminal development	14.00	sqm	OK
105	Land Required per bus for inter city terminal development	70.00	sqm	OK
106	Cost per bus for developing intra city depot	8,00,000	Rs.	OK
107	Cost per bus for developing Inter city depot	8,00,000	Rs.	OK
108	Cost per bus for developing intra city terminal	2,50,000	Rs.	OK
109	Cost per bus for developing Inter City Terminal	2,50,000	Rs.	OK
110	Average intra city depot capacity	100.00	Buses	OK
111	Average Inter City Depot Capacity	100.00	Buses	OK
112	Average Intra city terminal capacity	20.00	Bays	OK
113	Average Inter city terminal capacity	40.00	Bays	OK
114	Factor to relate Intra city terminal capacity to bus fleet (Fleet/(Capacity*X), where X=)	12.00		OK
115	Factor to relate Inter city terminal capacity to bus fleet (Fleet/(Capacity*X), where X=)	1.25		OK
116	% of non local STU buses using inter city terminal (as % of STU buses)	5%	%	OK
		Current (%)	Proposed (%)	Error Check
		x		OK
	INTRA CITY			
117	Mini/ Midi buses	0.00%	21%	
118	Regular Buses	100.00%	74%	
119	Luxury Coaches	0.00%	5%	OK
	INTER CITY			
120	Mini/ Midi buses	2.81%	20%	
121	Regular Buses	96.49%	75%	
122	Luxury Coaches	0.70%	5%	OK
123	Average Intra City Seating Capacity	44	32.56	
124	Average Inter City Seating Capacity	43.17097607	41.2617775	
125	Rate of change of occupancy % as % of gap (Intra City buses)	2.50%	Percent	OK
126	Rate of change of occupancy % as % of gap (Inter City buses)	2.50%	Percent	OK
127	Target/intended average staff number for each bus (Intra City)	6	Number	OK
128	Expected annual percentage change in staff to bus ration (Intra City)	10%	Percent	OK
129	Target/intended average staff number for each bus (Inter City)	6	Number	OK
130	Expected annual percentage change in staff to us ration (Inter City)	10%	Percent	OK
131	Target Operational Efficiency Intra City	100%		
132	Target Operational Efficency Inter City	100%		
133	Target Intra city buses per route	15		
134	Average annual rate of change of (as percent of current ratio) of Intra buses per route	0.01%	Percent	OK
135	Target Inter city buses per route	6		
136	Average annual rate of change of (as percent of current ratio) of Intra buses per route	0.67%	Percent	OK
137	Current average operational hours - Intra City	16	Hours	
138	Current average operational hours - Inter City	14	Hours	
139	Average staff salary Intercity (per month)	25000	25000	
140	Average staff salary Intracity (per month)	25000		
141	current year vehicle utilization	336.26	km	
142	vehicle utilization	340	km	

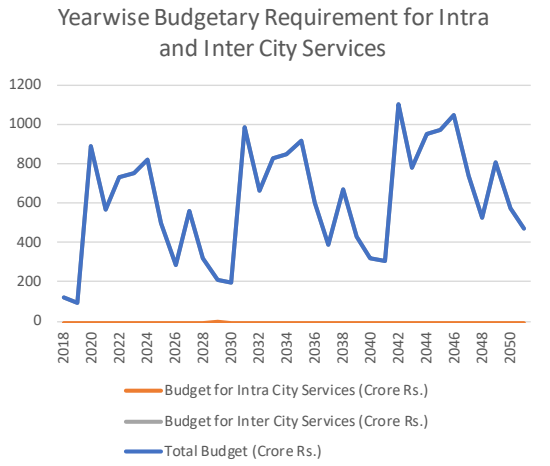
10.8 Outputs

10.8.1 Business as usual scenario

10.8.1.1 Year wise budgetary requirement (crores) for fleet and infrastructure

Year Wise Budgetary Requirement for Intra and Inter City Services

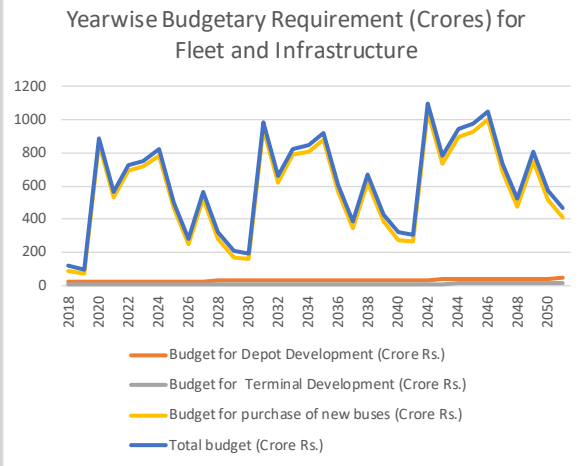
Year	Budget for Intra City Services (Crore Rs.)	Budget for Inter City Services (Crore Rs.)	Total Budget (Crore Rs.)
2018	0	122	122
2019	0	97	97
2020	0	890	890
2021	0	568	568
2022	0	730	730
2023	0	751	751
2024	0	820	820
2025	0	501	501
2026	0	286	286
2027	0	561	561
2028	0	321	321
2029	0	209	209
2030	0	196	196
2031	0	984	984
2032	0	663	663
2033	0	826	826
2034	0	849	849
2035	0	920	920
2036	0	603	603
2037	0	389	389
2038	0	667	667
2039	0	430	430
2040	0	320	320
2041	0	309	309
2042	0	1100	1100
2043	0	782	782
2044	0	948	948
2045	0	974	974
2046	0	1049	1049
2047	0	736	736
2048	0	526	526
2049	0	808	808
2050	0	575	575
2051	0	471	471



10.8.1.2 Year wise budgetary requirement for intra and inter city services

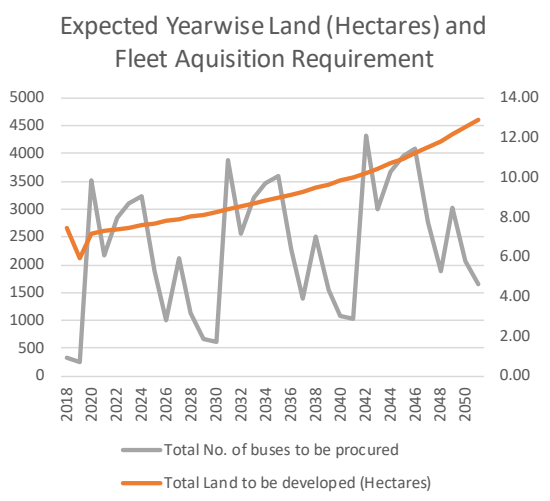
Yearwise Budgetary Requirement (Crores) for Fleet and Infrastructure

Year	Budget for Depot Development (Crore Rs.)	Budget for Terminal Development (Crore Rs.)	Budget for purchase of new buses (Crore Rs.)	Total budget (Crore Rs.)
2018	25	8	88	122
2019	20	6	70	97
2020	25	8	858	890
2021	25	8	536	568
2022	25	8	697	730
2023	26	8	717	751
2024	26	8	786	820
2025	26	8	467	501
2026	27	8	250	286
2027	27	8	525	561
2028	27	9	285	321
2029	28	9	173	209
2030	28	9	159	196
2031	29	9	946	984
2032	29	9	625	663
2033	30	9	787	826
2034	30	9	809	849
2035	31	10	880	920
2036	31	10	562	603
2037	32	10	348	389
2038	32	10	624	667
2039	33	10	386	430
2040	34	11	276	320
2041	34	11	264	309
2042	35	11	1054	1100
2043	36	11	735	782
2044	37	11	900	948
2045	38	12	925	974
2046	38	12	998	1049
2047	39	12	684	736
2048	41	13	473	526
2049	42	13	753	808
2050	43	13	519	575
2051	44	14	413	471



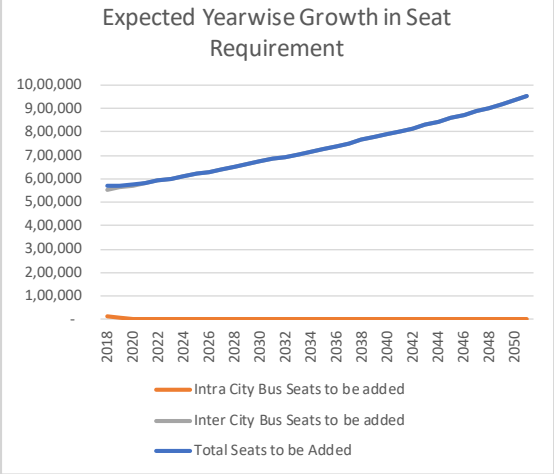
10.8.1.3 Expected Year wise Land (Hectares) and Fleet Acquisition Requirement

Expected Yearwise Land (Hectares) and Fleet Aquisition Requirement		
Year	Total Land to be developed (Hectares)	Total No. of buses to be procured
2018	7.42	318
2019	5.90	253
2020	7.19	3527
2021	7.28	2182
2022	7.38	2847
2023	7.48	3100
2024	7.58	3223
2025	7.69	1892
2026	7.79	991
2027	7.91	2113
2028	8.02	1126
2029	8.14	667
2030	8.27	607
2031	8.39	3886
2032	8.53	2547
2033	8.67	3218
2034	8.81	3478
2035	8.96	3606
2036	9.12	2283
2037	9.28	1388
2038	9.45	2517
2039	9.63	1538
2040	9.83	1087
2041	10.03	1036
2042	10.24	4325
2043	10.46	2995
2044	10.70	3677
2045	10.96	3947
2046	11.23	4087
2047	11.52	2776
2048	11.83	1895
2049	12.17	3039
2050	12.53	2075
2051	12.92	1641



10.8.1.4 Expected Year Wise Growth in Seat Requirement

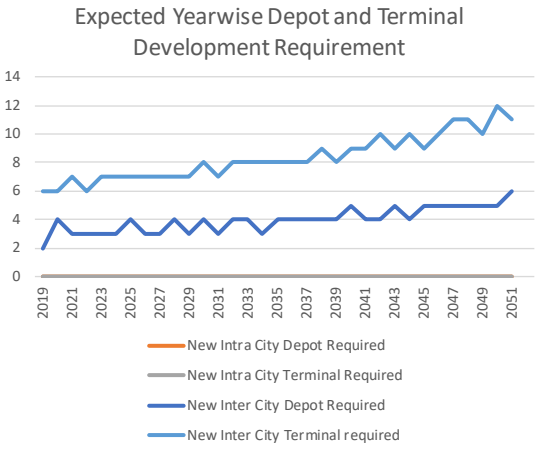
Expected Yearwise Growth in Seat Requirement			
Year	Intra City Bus Seats to be added	Inter City Bus Seats to be added	Total Seats to be Added
2018	16,032	5,55,796	5,71,828
2019	5,553	5,63,427	5,68,980
2020	1,929	5,72,731	5,74,660
2021	670	5,82,157	5,82,827
2022	233	5,91,707	5,91,939
2023	81	6,01,385	6,01,466
2024	28	6,11,196	6,11,224
2025	10	6,21,143	6,21,153
2026	3	6,31,231	6,31,234
2027	1	6,41,464	6,41,465
2028	0	6,51,847	6,51,847
2029	0	6,62,384	6,62,384
2030	0	6,73,082	6,73,082
2031	0	6,83,947	6,83,947
2032	0	6,94,983	6,94,983
2033	0	7,06,199	7,06,199
2034	0	7,17,601	7,17,601
2035	0	7,29,198	7,29,198
2036	0	7,40,998	7,40,998
2037	0	7,53,010	7,53,010
2038	0	7,65,245	7,65,245
2039	0	7,77,715	7,77,715
2040	0	7,90,431	7,90,431
2041	0	8,03,407	8,03,407
2042	0	8,16,658	8,16,658
2043	0	8,30,201	8,30,201
2044	0	8,44,054	8,44,054
2045	0	8,58,237	8,58,237
2046	0	8,72,772	8,72,772
2047	0	8,87,683	8,87,683
2048	0	9,02,998	9,02,998
2049	0	9,18,746	9,18,746
2050	0	9,34,961	9,34,961
2051	0	9,51,680	9,51,680



10.8.1.5 Expected Year wise Depot and Terminal development requirement

Expected Yearwise Depot and Terminal Development Requirement

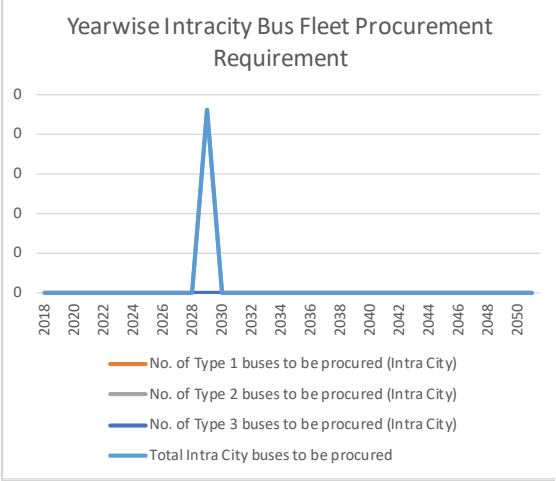
Year	New Intra City Depot Required	New Intra City Terminal Required	New Inter City Depot Required	New Inter City Terminal required
2018	0	0	3	6
2019	0	0	2	6
2020	0	0	4	6
2021	0	0	3	7
2022	0	0	3	6
2023	0	0	3	7
2024	0	0	3	7
2025	0	0	4	7
2026	0	0	3	7
2027	0	0	3	7
2028	0	0	4	7
2029	0	0	3	7
2030	0	0	4	8
2031	0	0	3	7
2032	0	0	4	8
2033	0	0	4	8
2034	0	0	3	8
2035	0	0	4	8
2036	0	0	4	8
2037	0	0	4	8
2038	0	0	4	9
2039	0	0	4	8
2040	0	0	5	9
2041	0	0	4	9
2042	0	0	4	10
2043	0	0	5	9
2044	0	0	4	10
2045	0	0	5	9
2046	0	0	5	10
2047	0	0	5	11
2048	0	0	5	11
2049	0	0	5	10
2050	0	0	5	12
2051	0	0	6	11



10.8.1.6 Year wise intracity bus fleet procurement

Yearwise Intracity Bus Fleet Procurement Requirement

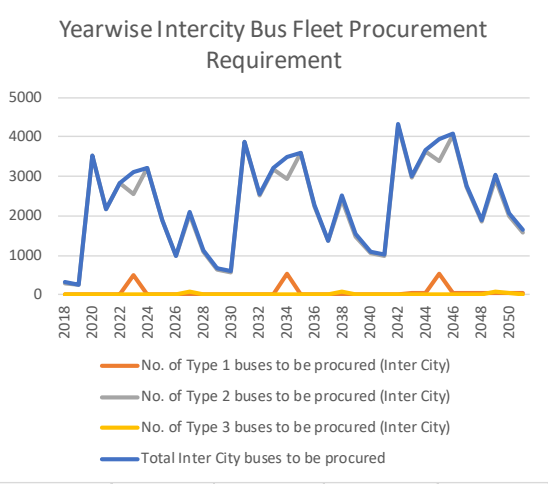
Year	No. of Type 1 buses to be procured (Intra City)	No. of Type 2 buses to be procured (Intra City)	No. of Type 3 buses to be procured (Intra City)	Total Intra City buses to be procured
2018	0	0	0	0
2019	0	0	0	0
2020	0	0	0	0
2021	0	0	0	0
2022	0	0	0	0
2023	0	0	0	0
2024	0	0	0	0
2025	0	0	0	0
2026	0	0	0	0
2027	0	0	0	0
2028	0	0	0	0
2029	0	0	0	0
2030	0	0	0	0
2031	0	0	0	0
2032	0	0	0	0
2033	0	0	0	0
2034	0	0	0	0
2035	0	0	0	0
2036	0	0	0	0
2037	0	0	0	0
2038	0	0	0	0
2039	0	0	0	0
2040	0	0	0	0
2041	0	0	0	0
2042	0	0	0	0
2043	0	0	0	0
2044	0	0	0	0
2045	0	0	0	0
2046	0	0	0	0
2047	0	0	0	0
2048	0	0	0	0
2049	0	0	0	0
2050	0	0	0	0
2051	0	0	0	0



10.8.1.7 Yearwise intercity bus fleet procurement

Yearwise Intercity Bus Fleet Procurement Requirement

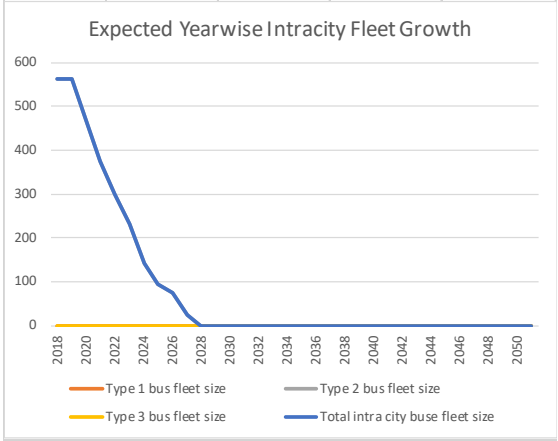
Year	No. of Type 1 buses to be procured (Inter City)	No. of Type 2 buses to be procured (Inter City)	No. of Type 3 buses to be procured (Inter City)	Total Inter City buses to be procured
2018	9	307	2	318
2019	7	244	2	253
2020	9	3516	2	3527
2021	9	2171	2	2182
2022	9	2818	20	2847
2023	516	2566	18	3100
2024	9	3211	2	3223
2025	9	1881	2	1892
2026	9	979	2	991
2027	9	2033	70	2113
2028	10	1089	27	1126
2029	19	643	5	667
2030	17	585	4	607
2031	19	3863	5	3886
2032	19	2523	5	2547
2033	19	3176	23	3218
2034	527	2930	21	3478
2035	20	3582	5	3606
2036	20	2257	5	2283
2037	21	1363	5	1388
2038	21	2423	73	2517
2039	21	1487	30	1538
2040	31	1049	8	1087
2041	29	1000	7	1036
2042	31	4286	8	4325
2043	32	2956	8	2995
2044	32	3618	26	3677
2045	540	3383	24	3947
2046	33	4046	8	4087
2047	34	2734	9	2776
2048	35	1852	9	1895
2049	35	2926	77	3039
2050	36	2004	34	2075
2051	46	1583	12	1641



10.8.1.8 Expected Yearwise Intracity Fleet Growth.

Expected Yearwise Intracity Fleet Growth

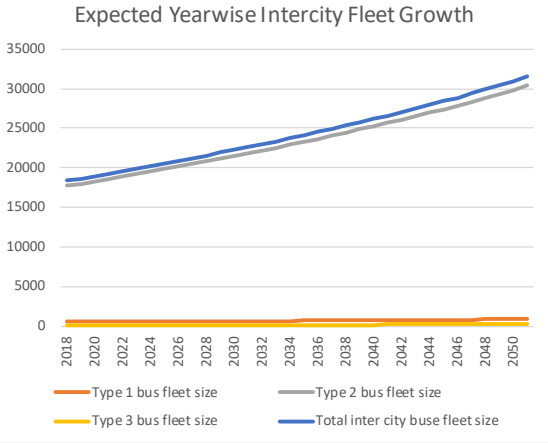
Year	Type 1 bus fleet size	Type 2 bus fleet size	Type 3 bus fleet size	Total intra city buse fleet size
2018	0	562	0	562
2019	0	562	0	562
2020	0	464	0	464
2021	0	376	0	376
2022	0	300	0	300
2023	0	231	0	231
2024	0	143	0	143
2025	0	95	0	95
2026	0	75	0	75
2027	0	23	0	23
2028	0	0	0	0
2029	0	0	0	0
2030	0	0	0	0
2031	0	0	0	0
2032	0	0	0	0
2033	0	0	0	0
2034	0	0	0	0
2035	0	0	0	0
2036	0	0	0	0
2037	0	0	0	0
2038	0	0	0	0
2039	0	0	0	0
2040	0	0	0	0
2041	0	0	0	0
2042	0	0	0	0
2043	0	0	0	0
2044	0	0	0	0
2045	0	0	0	0
2046	0	0	0	0
2047	0	0	0	0
2048	0	0	0	0
2049	0	0	0	0
2050	0	0	0	0
2051	0	0	0	0



10.8.1.9 Expected Year wise Intercity Fleet Growth.

Expected Yearwise Intercity Fleet Growth

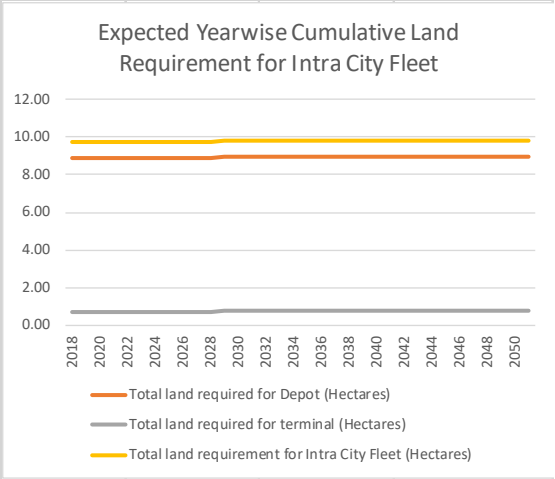
Year	Type 1 bus fleet size	Type 2 bus fleet size	Type 3 bus fleet size	Total inter city buse fleet size
2018	516	17747	129	18392
2019	523	17990	131	18644
2020	532	18287	133	18952
2021	540	18588	135	19264
2022	549	18893	138	19580
2023	558	19202	140	19900
2024	567	19516	142	20225
2025	577	19833	144	20554
2026	586	20155	147	20888
2027	595	20482	149	21227
2028	605	20814	152	21570
2029	615	21150	154	21919
2030	625	21492	157	22273
2031	635	21839	159	22632
2032	645	22191	162	22998
2033	656	22549	164	23369
2034	666	22913	167	23746
2035	677	23283	170	24130
2036	688	23660	172	24520
2037	699	24044	175	24918
2038	710	24434	178	25323
2039	722	24833	181	25735
2040	734	25239	184	26156
2041	746	25653	187	26586
2042	758	26076	190	27024
2043	771	26508	193	27472
2044	784	26951	196	27931
2045	797	27404	200	28400
2046	810	27868	203	28881
2047	824	28344	206	29374
2048	838	28833	210	29881
2049	853	29336	214	30402
2050	868	29853	217	30939
2051	883	30387	221	31492



10.8.1.10 Expected Year wise Cumulative Land Requirement for Intra City Fleet

Expected Yearwise Cumulative Land Requirement for Intra City Fleet

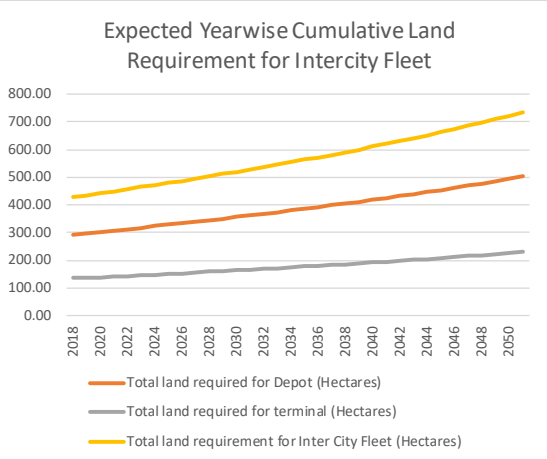
Year	Total land required for Depot (Hectares)	Total land required for terminal (Hectares)	Total land requirement for Intra City Fleet (Hectares)
2018	8.99	0.79	9.78
2019	8.99	0.79	9.78
2020	8.99	0.79	9.78
2021	8.99	0.79	9.78
2022	8.99	0.79	9.78
2023	8.99	0.79	9.78
2024	8.99	0.79	9.78
2025	8.99	0.79	9.78
2026	8.99	0.79	9.78
2027	8.99	0.79	9.78
2028	8.99	0.79	9.78
2029	8.99	0.79	9.78
2030	8.99	0.79	9.78
2031	8.99	0.79	9.78
2032	8.99	0.79	9.78
2033	8.99	0.79	9.78
2034	8.99	0.79	9.78
2035	8.99	0.79	9.78
2036	8.99	0.79	9.78
2037	8.99	0.79	9.78
2038	8.99	0.79	9.78
2039	8.99	0.79	9.78
2040	8.99	0.79	9.78
2041	8.99	0.79	9.78
2042	8.99	0.79	9.78
2043	8.99	0.79	9.78
2044	8.99	0.79	9.78
2045	8.99	0.79	9.78
2046	8.99	0.79	9.78
2047	8.99	0.79	9.78
2048	8.99	0.79	9.78
2049	8.99	0.79	9.78
2050	8.99	0.79	9.78
2051	8.99	0.79	9.78



10.8.1.11 Expected Yearwise Cumulative Land Requirement for Intercity Fleet

Expected Yearwise Cumulative Land Requirement for Intercity Fleet

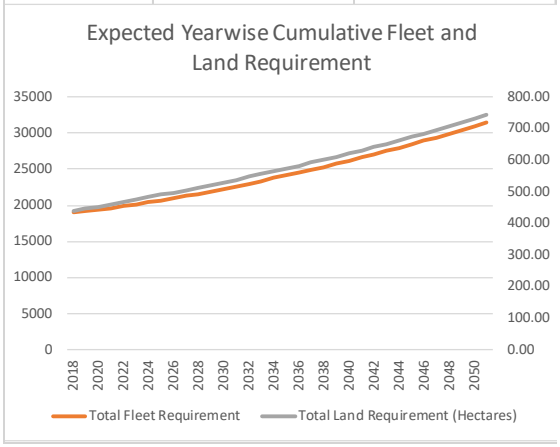
Year	Total land required for Depot (Hectares)	Total land required for terminal (Hectares)	Total land requirement for Inter City Fleet (Hectares)
2018	294.27	135.18	429.45
2019	298.31	137.04	435.35
2020	303.24	139.30	442.54
2021	308.23	141.59	449.82
2022	313.28	143.91	457.20
2023	318.41	146.27	464.68
2024	323.60	148.65	472.26
2025	328.87	151.07	479.94
2026	334.21	153.53	487.74
2027	339.63	156.02	495.64
2028	345.12	158.54	503.67
2029	350.70	161.10	511.81
2030	356.37	163.71	520.07
2031	362.12	166.35	528.47
2032	367.96	169.03	537.00
2033	373.90	171.76	545.66
2034	379.94	174.53	554.47
2035	386.08	177.35	563.43
2036	392.33	180.22	572.55
2037	398.69	183.15	581.83
2038	405.16	186.12	591.29
2039	411.77	189.16	600.92
2040	418.50	192.25	610.75
2041	425.37	195.40	620.77
2042	432.38	198.63	631.01
2043	439.56	201.92	641.48
2044	446.89	205.29	652.18
2045	454.40	208.74	663.14
2046	462.09	212.27	674.37
2047	469.99	215.90	685.89
2048	478.10	219.63	697.72
2049	486.44	223.46	709.89
2050	495.02	227.40	722.42
2051	503.87	231.47	735.34



10.8.1.12 Expected Yearwise Cumulative Fleet and Land Requirement

Expected Yearwise Cumulative Fleet and Land Requirement

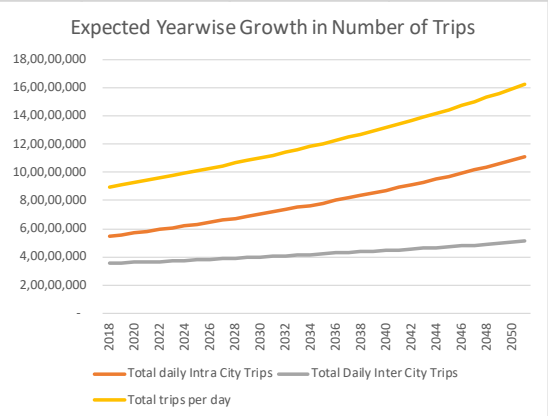
Year	Total Fleet Requirement	Total Land Requirement (Hectares)
2018	18954	439.23
2019	19206	445.13
2020	19416	452.31
2021	19640	459.60
2022	19880	466.98
2023	20131	474.45
2024	20368	482.03
2025	20649	489.72
2026	20963	497.52
2027	21250	505.42
2028	21570	513.44
2029	21919	521.59
2030	22273	529.85
2031	22632	538.25
2032	22998	546.78
2033	23369	555.44
2034	23746	564.25
2035	24130	573.21
2036	24520	582.33
2037	24918	591.61
2038	25323	601.07
2039	25735	610.70
2040	26156	620.53
2041	26586	630.55
2042	27024	640.79
2043	27472	651.25
2044	27931	661.96
2045	28400	672.92
2046	28881	684.15
2047	29374	695.67
2048	29881	707.50
2049	30402	719.67
2050	30939	732.20
2051	31492	745.12



10.8.1.13 Expected Yearwise Growth in Number of Trips

Expected Yearwise Growth in Number of Trips

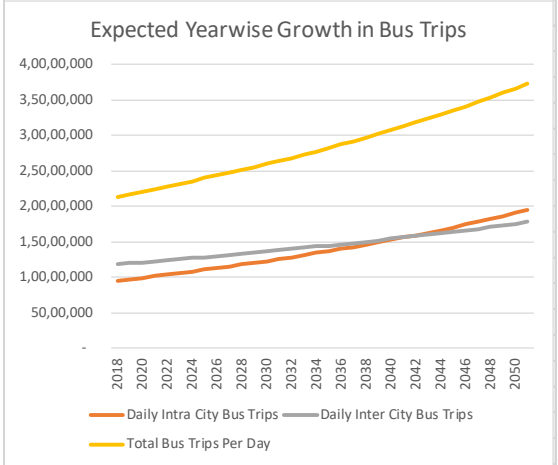
Year	Total daily Intra City Trips	Total Daily Inter City Trips	Total trips per day
2018	5,45,45,370	3,52,89,150	8,98,34,520
2019	5,57,08,018	3,56,52,052	9,13,60,070
2020	5,68,96,013	3,60,19,270	9,29,15,283
2021	5,81,09,971	3,63,90,917	9,45,00,888
2022	5,93,50,528	3,67,67,118	9,61,17,646
2023	6,06,18,346	3,71,48,005	9,77,66,351
2024	6,19,14,109	3,75,33,723	9,94,47,832
2025	6,32,38,527	3,79,24,429	10,11,62,956
2026	6,45,92,341	3,83,20,292	10,29,12,633
2027	6,59,76,320	3,87,21,499	10,46,97,819
2028	6,73,91,266	3,91,28,252	10,65,19,518
2029	6,88,38,018	3,95,40,769	10,83,78,787
2030	7,03,17,451	3,99,59,294	11,02,76,745
2031	7,18,30,481	4,03,84,088	11,22,14,569
2032	7,33,78,070	4,08,15,442	11,41,93,512
2033	7,49,61,226	4,12,53,671	11,62,14,897
2034	7,65,81,010	4,16,99,125	11,82,80,135
2035	7,82,38,539	4,21,52,185	12,03,90,724
2036	7,99,34,994	4,26,13,272	12,25,48,266
2037	8,16,71,621	4,30,82,850	12,47,54,471
2038	8,34,49,739	4,35,61,428	12,70,11,167
2039	8,52,70,749	4,40,49,570	12,93,20,319
2040	8,71,36,138	4,45,47,896	13,16,84,034
2041	8,90,47,490	4,50,57,093	13,41,04,583
2042	9,10,06,493	4,55,77,916	13,65,84,409
2043	9,30,14,951	4,61,11,205	13,91,26,156
2044	9,50,74,794	4,66,57,883	14,17,32,677
2045	9,71,88,092	4,72,18,975	14,44,07,067
2046	9,93,57,068	4,77,95,614	14,71,52,682
2047	10,15,84,111	4,83,89,054	14,99,73,165
2048	10,38,71,799	4,90,00,684	15,28,72,483
2049	10,62,22,912	4,96,32,043	15,58,54,955
2050	10,86,40,455	5,02,84,837	15,89,25,292
2051	11,11,27,684	5,09,60,955	16,20,88,639



10.8.1.14 Expected Yearwise Growth in Bus Trips

Expected Yearwise Growth in Bus Trips

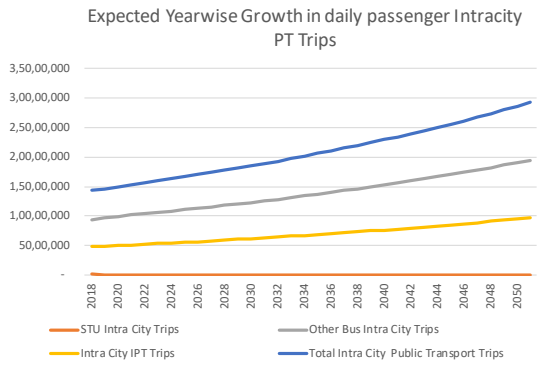
Year	Daily Intra City Bus Trips	Daily Inter City Bus Trips	Total Bus Trips Per Day
2018	95,58,292	1,18,56,074	2,14,14,367
2019	97,63,227	1,19,96,493	2,17,59,721
2020	99,71,907	1,21,38,622	2,21,10,530
2021	1,01,84,903	1,22,82,498	2,24,67,401
2022	1,04,02,488	1,24,28,160	2,28,30,648
2023	1,06,24,835	1,25,75,649	2,32,00,484
2024	1,08,52,086	1,27,25,010	2,35,77,096
2025	1,10,84,373	1,28,76,291	2,39,60,664
2026	1,13,21,831	1,30,29,544	2,43,51,375
2027	1,15,64,597	1,31,84,824	2,47,49,421
2028	1,18,12,815	1,33,42,192	2,51,55,006
2029	1,20,66,634	1,35,01,712	2,55,68,346
2030	1,23,26,211	1,36,63,456	2,59,89,667
2031	1,25,91,710	1,38,27,501	2,64,19,211
2032	1,28,63,303	1,39,93,930	2,68,57,233
2033	1,31,41,172	1,41,62,834	2,73,04,006
2034	1,34,25,506	1,43,34,313	2,77,59,820
2035	1,37,16,508	1,45,08,476	2,82,24,984
2036	1,40,14,388	1,46,85,443	2,86,99,832
2037	1,43,19,373	1,48,65,344	2,91,84,718
2038	1,46,31,701	1,50,48,324	2,96,80,025
2039	1,49,51,625	1,52,34,539	3,01,86,164
2040	1,52,79,414	1,54,24,163	3,07,03,577
2041	1,56,15,356	1,56,17,389	3,12,32,745
2042	1,59,59,758	1,58,14,426	3,17,74,184
2043	1,63,12,948	1,60,15,507	3,23,28,454
2044	1,66,75,277	1,62,20,888	3,28,96,165
2045	1,70,47,123	1,64,30,853	3,34,77,977
2046	1,74,28,893	1,66,45,716	3,40,74,609
2047	1,78,21,023	1,68,65,822	3,46,86,845
2048	1,82,23,987	1,70,91,554	3,53,15,541
2049	1,86,38,293	1,73,23,338	3,59,61,631
2050	1,90,64,494	1,75,61,642	3,66,26,136
2051	1,95,03,189	1,78,06,988	3,73,10,177



10.8.1.15 Expected Yearwise Growth in daily Intracity passenger intracity PT Trips

Expected Yearwise Growth in daiy Intracity passenger intracity PT Trips

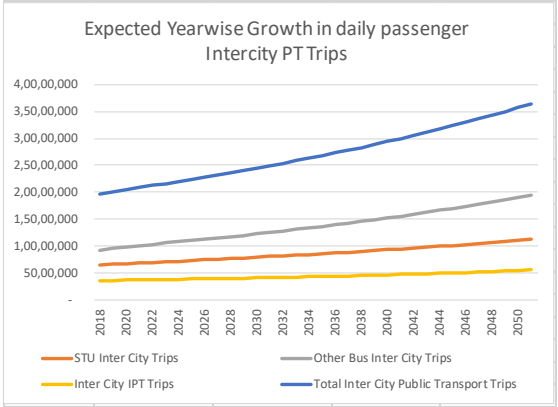
Year	STU Intra City Trips	Other Bus Intra City Trips	Intra City IPT Trips	Total Intra City Public Transport Trips
2018	2,05,857	93,52,435	47,92,296	1,43,50,588
2019	71,484	96,91,742	48,94,390	1,46,57,616
2020	24,823	99,47,080	49,98,704	1,49,70,607
2021	8,620	1,01,76,276	51,05,291	1,52,90,187
2022	2,993	1,03,99,485	52,14,206	1,56,16,684
2023	1,040	1,06,23,782	53,25,506	1,59,50,328
2024	361	1,08,51,708	54,39,250	1,62,91,319
2025	125	1,10,84,226	55,55,499	1,66,39,851
2026	44	1,13,21,761	56,74,317	1,69,96,121
2027	15	1,15,64,550	57,95,770	1,73,60,335
2028	5	1,18,12,771	59,19,926	1,77,32,703
2029	2	1,20,66,587	60,46,858	1,81,13,447
2030	1	1,23,26,158	61,76,640	1,85,02,798
2031	0	1,25,91,649	63,09,349	1,89,00,999
2032	0	1,28,63,233	64,45,069	1,93,08,302
2033	0	1,31,41,091	65,83,884	1,97,24,976
2034	0	1,34,25,414	67,25,885	2,01,51,299
2035	0	1,37,16,402	68,71,166	2,05,87,568
2036	0	1,40,14,268	70,19,827	2,10,34,094
2037	0	1,43,19,236	71,71,972	2,14,91,208
2038	0	1,46,31,545	73,27,712	2,19,59,258
2039	0	1,49,51,449	74,87,166	2,24,38,615
2040	0	1,52,79,215	76,50,457	2,29,29,672
2041	0	1,56,15,132	78,17,717	2,34,32,849
2042	0	1,59,59,505	79,89,088	2,39,48,593
2043	0	1,63,12,663	81,64,719	2,44,77,382
2044	0	1,66,74,957	83,44,771	2,50,19,728
2045	0	1,70,46,764	85,29,414	2,55,76,178
2046	0	1,74,28,490	87,18,832	2,61,47,323
2047	0	1,78,20,572	89,13,223	2,67,33,795
2048	0	1,82,23,482	91,12,798	2,73,36,279
2049	0	1,86,37,728	93,17,785	2,79,55,513
2050	0	1,90,63,862	95,28,431	2,85,92,293
2051	0	1,95,02,482	97,45,002	2,92,47,484



10.8.1.16 Expected Yearwise Growth in daily Intercity passenger intercity PT Trips

Expected Yearwise Growth in daily Intercity passenger intercity PT Trips

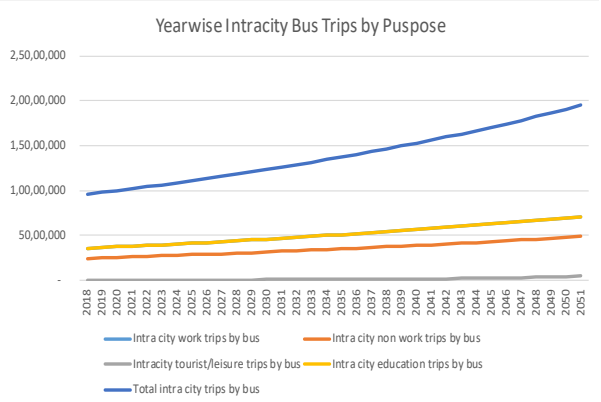
Year	STU Inter City Trips	Other Bus Inter City Trips	Inter City IPT Trips	Total Inter City Public Transport Trips
2018	65,91,623	93,52,435	36,59,886	1,96,03,944
2019	66,99,143	96,91,742	36,99,609	2,00,90,494
2020	68,08,173	99,47,080	37,39,935	2,04,95,188
2021	69,18,743	1,01,76,276	37,80,893	2,08,75,912
2022	70,30,889	1,03,99,485	38,22,512	2,12,52,885
2023	71,44,646	1,06,23,782	38,64,825	2,16,33,253
2024	72,60,052	1,08,51,708	39,07,868	2,20,19,628
2025	73,77,150	1,10,84,226	39,51,681	2,24,13,058
2026	74,95,984	1,13,21,761	39,96,309	2,28,14,054
2027	76,16,601	1,15,64,550	40,41,799	2,32,22,949
2028	77,39,053	1,18,12,771	40,88,204	2,36,40,028
2029	78,63,395	1,20,66,587	41,35,583	2,40,65,565
2030	79,89,688	1,23,26,158	41,84,001	2,44,99,847
2031	81,17,996	1,25,91,649	42,33,530	2,49,43,175
2032	82,48,391	1,28,63,233	42,84,248	2,53,95,872
2033	83,80,948	1,31,41,091	43,36,243	2,58,58,282
2034	85,15,753	1,34,25,414	43,89,611	2,63,30,778
2035	86,52,897	1,37,16,402	44,44,460	2,68,13,758
2036	87,92,480	1,40,14,268	45,00,906	2,73,07,654
2037	89,34,611	1,43,19,236	45,59,083	2,78,12,930
2038	90,79,411	1,46,31,545	46,19,133	2,83,30,089
2039	92,27,011	1,49,51,449	46,81,219	2,88,59,679
2040	93,77,558	1,52,79,215	47,45,518	2,94,02,292
2041	95,31,211	1,56,15,132	48,12,228	2,99,58,570
2042	96,88,145	1,59,59,505	48,81,567	3,05,29,217
2043	98,48,556	1,63,12,663	49,53,778	3,11,14,996
2044	1,00,12,656	1,66,74,957	50,29,130	3,17,16,743
2045	1,01,80,684	1,70,46,764	51,07,921	3,23,35,370
2046	1,03,52,900	1,74,28,490	51,90,484	3,29,71,874
2047	1,05,29,593	1,78,20,572	52,77,186	3,36,27,351
2048	1,07,11,085	1,82,23,482	53,68,434	3,43,03,001
2049	1,08,97,730	1,86,37,728	54,64,681	3,50,00,139
2050	1,10,89,921	1,90,63,862	55,66,431	3,57,20,214
2051	1,12,88,094	1,95,02,482	56,74,240	3,64,64,817



10.8.1.17 Yearwise Intracity Bus Trips by Purpose

Yearwise Intracity Bus Trips by Puspose

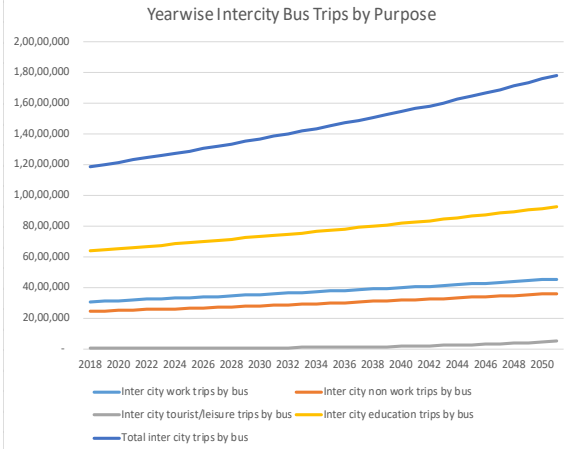
Year	Intra city work trips by bus	Intra city non work trips by bus	Intracity tourist/leisure trips by bus	Intra city education trips by bus	Total intra city trips by bus
2018	35,56,943	24,36,436	13,084	3551829	95,58,292
2019	36,32,784	24,88,367	14,542	3627534	97,63,227
2020	37,09,950	25,41,217	16,162	3704578	99,71,907
2021	37,88,653	25,95,124	17,961	3783164	1,01,84,903
2022	38,68,991	26,50,153	19,960	3863384	1,04,02,488
2023	39,51,020	27,06,340	22,182	3945294	1,06,24,835
2024	40,34,784	27,63,716	24,650	4028936	1,08,52,086
2025	41,20,322	28,22,307	27,394	4114350	1,10,84,373
2026	42,07,673	28,82,140	30,443	4201575	1,13,21,831
2027	42,96,876	29,43,242	33,831	4290648	1,15,64,597
2028	43,87,969	30,05,638	37,597	4381610	1,18,12,815
2029	44,80,994	30,69,358	41,781	4474500	1,20,66,634
2030	45,75,991	31,34,428	46,431	4569360	1,23,26,211
2031	46,73,003	32,00,878	51,599	4666230	1,25,91,710
2032	47,72,070	32,68,737	57,342	4765154	1,28,63,303
2033	48,73,238	33,38,034	63,724	4866175	1,31,41,172
2034	49,76,551	34,08,800	70,817	4969338	1,34,25,506
2035	50,82,054	34,81,067	78,699	5074688	1,37,16,508
2036	51,89,793	35,54,866	87,458	5182272	1,40,14,388
2037	52,99,817	36,30,229	97,192	5292136	1,43,19,373
2038	54,12,173	37,07,190	1,08,010	5404329	1,46,31,701
2039	55,26,911	37,85,782	1,20,031	5518901	1,49,51,625
2040	56,44,081	38,66,041	1,33,391	5635902	1,52,79,414
2041	57,63,736	39,48,001	1,48,237	5755383	1,56,15,356
2042	58,85,927	40,31,698	1,64,736	5877397	1,59,59,758
2043	60,10,709	41,17,170	1,83,071	6001998	1,63,12,948
2044	61,38,136	42,04,454	2,03,447	6129240	1,66,75,277
2045	62,68,264	42,93,589	2,26,090	6259180	1,70,47,123
2046	64,01,151	43,84,613	2,51,254	6391874	1,74,28,893
2047	65,36,856	44,77,567	2,79,219	6527382	1,78,21,023
2048	66,75,437	45,72,491	3,10,296	6665763	1,82,23,987
2049	68,16,957	46,69,428	3,44,832	6807077	1,86,38,293
2050	69,61,476	47,68,420	3,83,211	6951387	1,90,64,494
2051	71,09,059	48,69,510	4,25,863	7098756	1,95,03,189



10.8.1.18 Yearwise Intercity Bus Trips by Purpose

Yearwise Intercity Bus Trips by Purpose

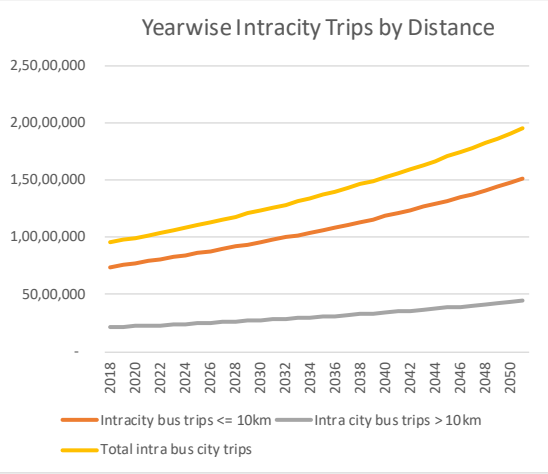
Year	Inter city work trips by bus	Inter city non work trips by bus	Inter city tourist/leisure trips by bus	Inter city education trips by bus	Total inter city trips by bus
2018	30,54,024	24,19,986	13,807	6368257	1,18,56,074
2019	30,91,007	24,49,367	15,373	6440747	1,19,96,493
2020	31,28,414	24,79,085	17,117	6514007	1,21,38,622
2021	31,66,250	25,09,142	19,058	6588048	1,22,82,498
2022	32,04,521	25,39,544	21,219	6662876	1,24,28,160
2023	32,43,231	25,70,294	23,625	6738499	1,25,75,649
2024	32,82,384	26,01,396	26,303	6814927	1,27,25,010
2025	33,21,986	26,32,853	29,285	6892167	1,28,76,291
2026	33,62,042	26,64,670	32,605	6970227	1,30,29,544
2027	34,02,557	26,96,851	36,300	7049116	1,31,84,824
2028	34,43,536	27,29,399	40,414	7128843	1,33,42,192
2029	34,84,984	27,62,320	44,993	7209415	1,35,01,712
2030	35,26,907	27,95,616	50,091	7290843	1,36,63,456
2031	35,69,309	28,29,292	55,766	7373134	1,38,27,501
2032	36,12,196	28,63,353	62,083	7456298	1,39,93,930
2033	36,55,574	28,97,802	69,115	7540343	1,41,62,834
2034	36,99,448	29,32,644	76,943	7625278	1,43,34,313
2035	37,43,824	29,67,883	85,656	7711113	1,45,08,476
2036	37,88,706	30,03,525	95,355	7797857	1,46,85,443
2037	38,34,102	30,39,572	1,06,152	7885519	1,48,65,344
2038	38,80,015	30,76,030	1,18,169	7974109	1,50,48,324
2039	39,26,453	31,12,903	1,31,546	8063636	1,52,34,539
2040	39,73,422	31,50,196	1,46,436	8154109	1,54,24,163
2041	40,20,926	31,87,914	1,63,009	8245539	1,56,17,389
2042	40,68,972	32,26,061	1,81,457	8337936	1,58,14,426
2043	41,17,567	32,64,642	2,01,990	8431308	1,60,15,507
2044	41,66,715	33,03,661	2,24,845	8525667	1,62,20,888
2045	42,16,424	33,43,125	2,50,283	8621021	1,64,30,853
2046	42,66,699	33,83,037	2,78,597	8717383	1,66,45,716
2047	43,17,547	34,23,402	3,10,111	8814761	1,68,65,822
2048	43,68,975	34,64,227	3,45,187	8913166	1,70,91,554
2049	44,20,988	35,05,514	3,84,226	9012609	1,73,23,338
2050	44,73,594	35,47,271	4,27,676	9113101	1,75,61,642
2051	45,26,798	35,89,502	4,76,036	9214652	1,78,06,988



10.8.1.19 Yearwise Intracity Trips by Distance

Yearwise Intracity Trips by Distance

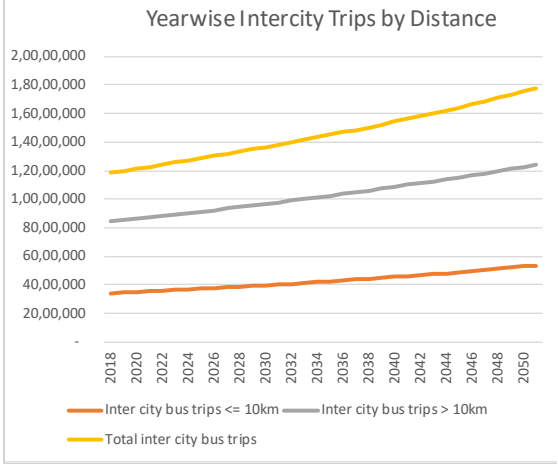
Year	Intracity bus trips <= 10km	Intra city bus trips > 10km	Total intra bus city trips
2018	74,24,800	21,33,492	95,58,292
2019	75,83,533	21,79,694	97,63,227
2020	77,45,304	22,26,603	99,71,907
2021	79,10,452	22,74,451	1,01,84,903
2022	80,79,149	23,23,339	1,04,02,488
2023	82,51,513	23,73,322	1,06,24,835
2024	84,27,646	24,24,441	1,08,52,086
2025	86,07,643	24,76,730	1,10,84,373
2026	87,91,604	25,30,227	1,13,21,831
2027	89,79,629	25,84,968	1,15,64,597
2028	91,71,823	26,40,991	1,18,12,815
2029	93,68,295	26,98,339	1,20,66,634
2030	95,69,158	27,57,053	1,23,26,211
2031	97,74,530	28,17,180	1,25,91,710
2032	99,84,535	28,78,769	1,28,63,303
2033	1,01,99,302	29,41,870	1,31,41,172
2034	1,04,18,966	30,06,540	1,34,25,506
2035	1,06,43,670	30,72,837	1,37,16,508
2036	1,08,73,564	31,40,825	1,40,14,388
2037	1,11,08,803	32,10,570	1,43,19,373
2038	1,13,49,556	32,82,146	1,46,31,701
2039	1,15,95,996	33,55,629	1,49,51,625
2040	1,18,48,309	34,31,105	1,52,79,414
2041	1,21,06,692	35,08,664	1,56,15,356
2042	1,23,71,355	35,88,403	1,59,59,758
2043	1,26,42,518	36,70,429	1,63,12,948
2044	1,29,20,420	37,54,857	1,66,75,277
2045	1,32,05,313	38,41,810	1,70,47,123
2046	1,34,97,468	39,31,425	1,74,28,893
2047	1,37,97,175	40,23,848	1,78,21,023
2048	1,41,04,745	41,19,242	1,82,23,987
2049	1,44,20,512	42,17,781	1,86,38,293
2050	1,47,44,838	43,19,656	1,90,64,494
2051	1,50,78,111	44,25,078	1,95,03,189



10.8.1.20 Yearwise Intercity Trips by Distance

Yearwise Intercity Trips by Distance

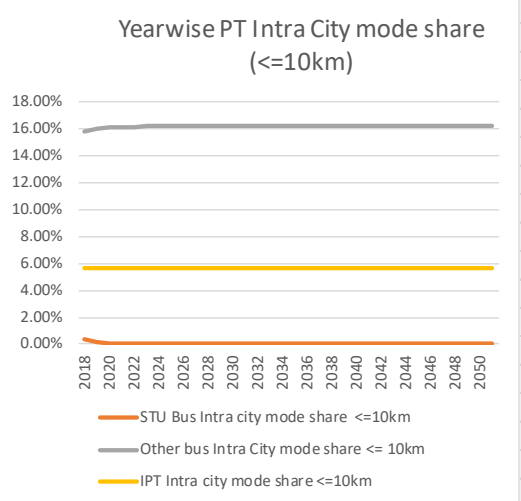
Year	Inter city bus trips <= 10km	Inter city bus trips > 10km	Total inter city bus trips
2018	34,15,407	84,40,667	1,18,56,074
2019	34,59,147	85,37,347	1,19,96,493
2020	35,03,465	86,35,158	1,21,38,622
2021	35,48,379	87,34,120	1,22,82,498
2022	35,93,906	88,34,254	1,24,28,160
2023	36,40,066	89,35,583	1,25,75,649
2024	36,86,880	90,38,129	1,27,25,010
2025	37,34,372	91,41,919	1,28,76,291
2026	37,82,567	92,46,977	1,30,29,544
2027	38,31,491	93,53,333	1,31,84,824
2028	38,81,176	94,61,016	1,33,42,192
2029	39,31,654	95,70,058	1,35,01,712
2030	39,82,962	96,80,495	1,36,63,456
2031	40,35,139	97,92,362	1,38,27,501
2032	40,88,228	99,05,702	1,39,93,930
2033	41,42,278	1,00,20,555	1,41,62,834
2034	41,97,342	1,01,36,971	1,43,34,313
2035	42,53,479	1,02,54,998	1,45,08,476
2036	43,10,751	1,03,74,692	1,46,85,443
2037	43,69,231	1,04,96,113	1,48,65,344
2038	44,28,997	1,06,19,327	1,50,48,324
2039	44,90,135	1,07,44,403	1,52,34,539
2040	45,52,743	1,08,71,421	1,54,24,163
2041	46,16,925	1,10,00,464	1,56,17,389
2042	46,82,800	1,11,31,626	1,58,14,426
2043	47,50,498	1,12,65,009	1,60,15,507
2044	48,20,163	1,14,00,725	1,62,20,888
2045	48,91,957	1,15,38,896	1,64,30,853
2046	49,66,057	1,16,79,659	1,66,45,716
2047	50,42,659	1,18,23,163	1,68,65,822
2048	51,21,984	1,19,69,570	1,70,91,554
2049	52,04,274	1,21,19,064	1,73,23,338
2050	52,89,799	1,22,71,843	1,75,61,642
2051	53,78,860	1,24,28,128	1,78,06,988



10.8.1.21 Yearwise PT Intra City mode share (<=10km)

Yearwise PT Intra City mode share (<=10km)

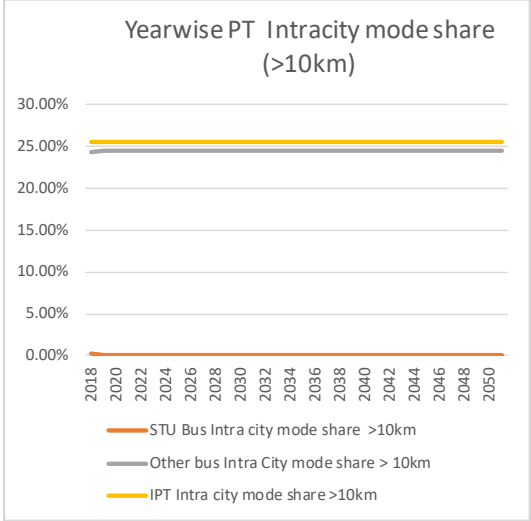
Year	STU Bus Intra city mode share <=10km	Other bus Intra City mode share <= 10km	IPT Intra city mode share <=10km
2018	0.39%	15.80%	5.61%
2019	0.13%	16.06%	5.61%
2020	0.04%	16.15%	5.61%
2021	0.02%	16.17%	5.61%
2022	0.01%	16.18%	5.61%
2023	0.00%	16.19%	5.61%
2024	0.00%	16.19%	5.61%
2025	0.00%	16.19%	5.61%
2026	0.00%	16.19%	5.61%
2027	0.00%	16.19%	5.61%
2028	0.00%	16.19%	5.61%
2029	0.00%	16.19%	5.61%
2030	0.00%	16.19%	5.61%
2031	0.00%	16.19%	5.61%
2032	0.00%	16.19%	5.61%
2033	0.00%	16.19%	5.61%
2034	0.00%	16.19%	5.61%
2035	0.00%	16.19%	5.61%
2036	0.00%	16.19%	5.61%
2037	0.00%	16.19%	5.61%
2038	0.00%	16.19%	5.61%
2039	0.00%	16.19%	5.61%
2040	0.00%	16.19%	5.61%
2041	0.00%	16.19%	5.61%
2042	0.00%	16.19%	5.61%
2043	0.00%	16.19%	5.61%
2044	0.00%	16.19%	5.61%
2045	0.00%	16.19%	5.61%
2046	0.00%	16.19%	5.61%
2047	0.00%	16.19%	5.61%
2048	0.00%	16.19%	5.61%
2049	0.00%	16.19%	5.61%
2050	0.00%	16.19%	5.61%
2051	0.00%	16.19%	5.61%



10.8.1.22 Yearwise PT Intracity mode share (>10km)

Yearwise PT Intracity mode share (>10km)

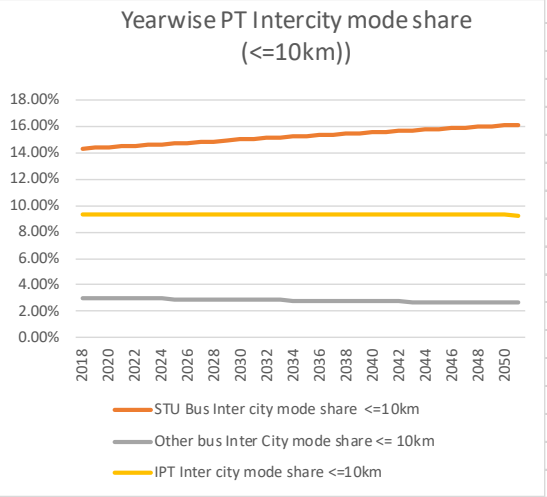
Year	STU Bus Intra city mode share >10km	Other bus Intra City mode share > 10km	IPT Intra city mode share >10km
2018	0.33%	24.26%	25.58%
2019	0.11%	24.48%	25.58%
2020	0.04%	24.55%	25.58%
2021	0.01%	24.58%	25.58%
2022	0.00%	24.59%	25.58%
2023	0.00%	24.59%	25.58%
2024	0.00%	24.59%	25.58%
2025	0.00%	24.59%	25.58%
2026	0.00%	24.59%	25.58%
2027	0.00%	24.59%	25.58%
2028	0.00%	24.59%	25.58%
2029	0.00%	24.59%	25.58%
2030	0.00%	24.59%	25.58%
2031	0.00%	24.59%	25.58%
2032	0.00%	24.59%	25.58%
2033	0.00%	24.59%	25.58%
2034	0.00%	24.59%	25.58%
2035	0.00%	24.59%	25.58%
2036	0.00%	24.59%	25.58%
2037	0.00%	24.59%	25.58%
2038	0.00%	24.59%	25.58%
2039	0.00%	24.59%	25.58%
2040	0.00%	24.59%	25.58%
2041	0.00%	24.59%	25.58%
2042	0.00%	24.59%	25.58%
2043	0.00%	24.59%	25.58%
2044	0.00%	24.59%	25.58%
2045	0.00%	24.59%	25.58%
2046	0.00%	24.59%	25.58%
2047	0.00%	24.59%	25.58%
2048	0.00%	24.59%	25.58%
2049	0.00%	24.59%	25.58%
2050	0.00%	24.59%	25.58%
2051	0.00%	24.59%	25.58%



10.8.1.23 Yearwise PT Intercity mode share (<=10km)

Yearwise PT Intercity mode share (<=10km)

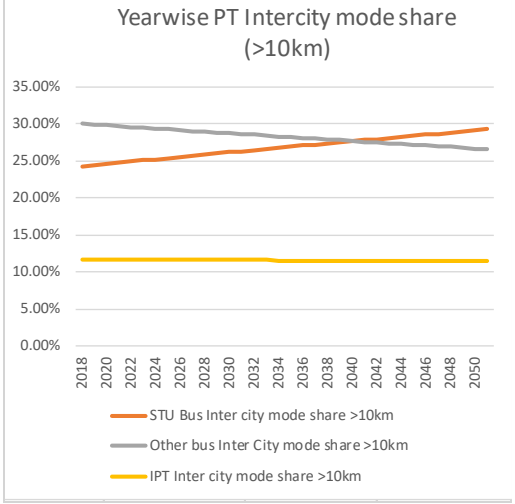
Year	STU Bus Inter city mode share <=10km	Other bus Inter City mode share <= 10km	IPT Inter city mode share <=10km
2018	14.29%	3.02%	9.31%
2019	14.35%	3.00%	9.31%
2020	14.41%	2.99%	9.31%
2021	14.47%	2.98%	9.31%
2022	14.52%	2.97%	9.31%
2023	14.58%	2.96%	9.31%
2024	14.64%	2.94%	9.31%
2025	14.70%	2.93%	9.31%
2026	14.75%	2.92%	9.31%
2027	14.81%	2.91%	9.31%
2028	14.87%	2.90%	9.31%
2029	14.92%	2.89%	9.31%
2030	14.98%	2.87%	9.31%
2031	15.03%	2.86%	9.31%
2032	15.09%	2.85%	9.31%
2033	15.14%	2.84%	9.31%
2034	15.20%	2.83%	9.31%
2035	15.25%	2.82%	9.31%
2036	15.31%	2.81%	9.31%
2037	15.36%	2.79%	9.31%
2038	15.42%	2.78%	9.31%
2039	15.47%	2.77%	9.31%
2040	15.52%	2.76%	9.31%
2041	15.58%	2.75%	9.31%
2042	15.63%	2.74%	9.31%
2043	15.68%	2.73%	9.31%
2044	15.74%	2.72%	9.31%
2045	15.79%	2.71%	9.31%
2046	15.84%	2.70%	9.31%
2047	15.89%	2.68%	9.31%
2048	15.95%	2.67%	9.31%
2049	16.00%	2.66%	9.31%
2050	16.05%	2.65%	9.31%
2051	16.10%	2.64%	9.31%



10.8.1.24 Yearwise PT Intercity mode share (>10km)

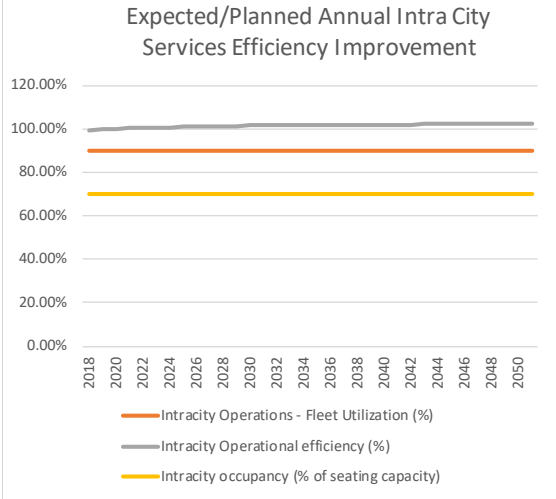
Yearwise PT Intercity mode share (>10km)

Year	STU Bus Inter city mode share >10km	Other bus Inter City mode share >10km	IPT Inter city mode share >10km
2018	24.24%	30.02%	11.71%
2019	24.40%	29.91%	11.71%
2020	24.57%	29.80%	11.71%
2021	24.73%	29.69%	11.71%
2022	24.89%	29.58%	11.71%
2023	25.04%	29.47%	11.71%
2024	25.20%	29.36%	11.71%
2025	25.36%	29.25%	11.71%
2026	25.52%	29.14%	11.71%
2027	25.67%	29.03%	11.71%
2028	25.83%	28.93%	11.71%
2029	25.98%	28.82%	11.71%
2030	26.14%	28.71%	11.71%
2031	26.29%	28.61%	11.71%
2032	26.45%	28.50%	11.71%
2033	26.60%	28.40%	11.71%
2034	26.75%	28.29%	11.71%
2035	26.90%	28.19%	11.71%
2036	27.05%	28.09%	11.71%
2037	27.20%	27.98%	11.71%
2038	27.35%	27.88%	11.71%
2039	27.50%	27.78%	11.71%
2040	27.65%	27.67%	11.71%
2041	27.80%	27.57%	11.71%
2042	27.95%	27.47%	11.71%
2043	28.09%	27.37%	11.71%
2044	28.24%	27.27%	11.71%
2045	28.39%	27.17%	11.71%
2046	28.53%	27.07%	11.71%
2047	28.67%	26.97%	11.71%
2048	28.82%	26.87%	11.71%
2049	28.96%	26.77%	11.71%
2050	29.10%	26.68%	11.71%
2051	29.25%	26.58%	11.71%



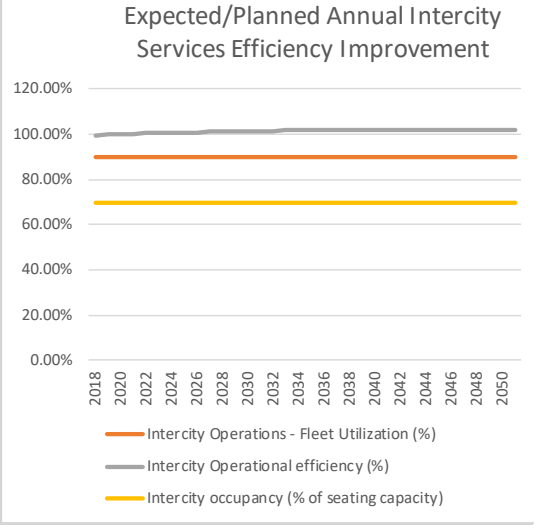
10.8.1.25 Expected/Planned Annual Intra City Services Efficiency Improvement

Expected/Planned Annual Intra City Services Efficiency Improvem			
Year	Intracity Operations - Fleet Utilization (%)	Intracity Operational efficiency (%)	Intracity occupancy (% of seating capacity)
2018	89.97%	99.49%	70.00%
2019	89.97%	99.74%	70.00%
2020	89.97%	99.97%	70.00%
2021	89.97%	100.18%	70.00%
2022	89.97%	100.37%	70.00%
2023	89.97%	100.54%	70.00%
2024	89.97%	100.70%	70.00%
2025	89.97%	100.85%	70.00%
2026	89.97%	100.98%	70.00%
2027	89.97%	101.10%	70.00%
2028	89.97%	101.20%	70.00%
2029	89.97%	101.30%	70.00%
2030	89.97%	101.39%	70.00%
2031	89.97%	101.47%	70.00%
2032	89.97%	101.55%	70.00%
2033	89.97%	101.62%	70.00%
2034	89.97%	101.68%	70.00%
2035	89.97%	101.73%	70.00%
2036	89.97%	101.78%	70.00%
2037	89.97%	101.83%	70.00%
2038	89.97%	101.87%	70.00%
2039	89.97%	101.91%	70.00%
2040	89.97%	101.95%	70.00%
2041	89.97%	101.98%	70.00%
2042	89.97%	102.01%	70.00%
2043	89.97%	102.03%	70.00%
2044	89.97%	102.06%	70.00%
2045	89.97%	102.08%	70.00%
2046	89.97%	102.10%	70.00%
2047	89.97%	102.12%	70.00%
2048	89.97%	102.13%	70.00%
2049	89.97%	102.15%	70.00%
2050	89.97%	102.16%	70.00%
2051	89.97%	102.17%	70.00%



10.8.1.26 Expected/Planned Annual Intercity Services Efficiency Improvement

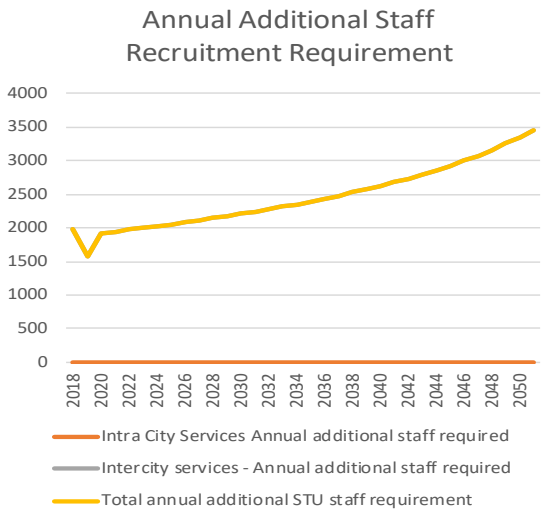
Expected/Planned Annual Intercity Services Efficiency Improvement			
Year	Intercity Operations - Fleet Utilization (%)	Intercity Operational efficiency (%)	Intercity occupancy (% of seating capacity)
2018	89.97%	99.49%	70.00%
2019	89.97%	99.74%	70.00%
2020	89.97%	99.97%	70.00%
2021	89.97%	100.18%	70.00%
2022	89.97%	100.37%	70.00%
2023	89.97%	100.54%	70.00%
2024	89.97%	100.70%	70.00%
2025	89.97%	100.85%	70.00%
2026	89.97%	100.98%	70.00%
2027	89.97%	101.10%	70.00%
2028	89.97%	101.20%	70.00%
2029	89.97%	101.30%	70.00%
2030	89.97%	101.39%	70.00%
2031	89.97%	101.47%	70.00%
2032	89.97%	101.55%	70.00%
2033	89.97%	101.62%	70.00%
2034	89.97%	101.68%	70.00%
2035	89.97%	101.73%	70.00%
2036	89.97%	101.78%	70.00%
2037	89.97%	101.83%	70.00%
2038	89.97%	101.87%	70.00%
2039	89.97%	101.91%	70.00%
2040	89.97%	101.95%	70.00%
2041	89.97%	101.98%	70.00%
2042	89.97%	102.01%	70.00%
2043	89.97%	102.03%	70.00%
2044	89.97%	102.06%	70.00%
2045	89.97%	102.08%	70.00%
2046	89.97%	102.10%	70.00%
2047	89.97%	102.12%	70.00%
2048	89.97%	102.13%	70.00%
2049	89.97%	102.15%	70.00%
2050	89.97%	102.16%	70.00%
2051	89.97%	102.17%	70.00%



10.8.1.27 Annual Additional Staff Recruitment Requirement

Annual Additional Staff Recruitment Requirement

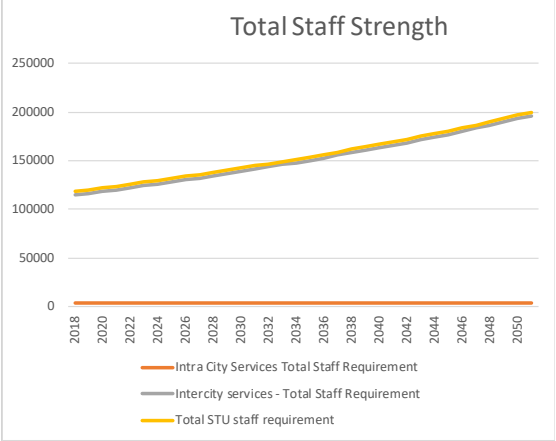
Year	Intra City Services Annual additional staff required	Intercity services - Annual additional staff required	Total annual additional STU staff requirement
2018	0	1983	1983
2019	0	1576	1576
2020	0	1921	1921
2021	0	1946	1946
2022	0	1972	1972
2023	0	1999	1999
2024	0	2026	2026
2025	0	2054	2054
2026	0	2083	2083
2027	0	2113	2113
2028	0	2143	2143
2029	0	2176	2176
2030	0	2209	2209
2031	0	2244	2244
2032	0	2279	2279
2033	0	2316	2316
2034	0	2354	2354
2035	0	2395	2395
2036	0	2436	2436
2037	0	2481	2481
2038	0	2526	2526
2039	0	2575	2575
2040	0	2625	2625
2041	0	2680	2680
2042	0	2736	2736
2043	0	2797	2797
2044	0	2860	2860
2045	0	2929	2929
2046	0	3001	3001
2047	0	3079	3079
2048	0	3162	3162
2049	0	3252	3252
2050	0	3348	3348
2051	0	3452	3452



10.8.1.28 Total Staff Strength

Total Staff Strength

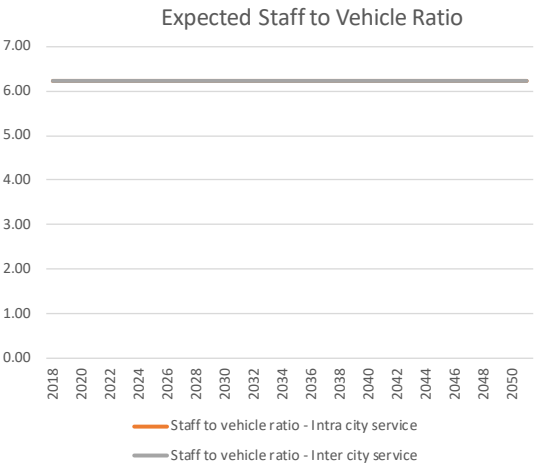
Year	Intra City Services Total Staff Requirement	Intercity services - Total Staff Requirement	Total STU staff requirement
2018	3507	114765	118272
2019	3507	116341	119848
2020	3507	118262	121769
2021	3507	120208	123715
2022	3507	122180	125687
2023	3507	124179	127686
2024	3507	126205	129712
2025	3507	128259	131766
2026	3507	130342	133849
2027	3507	132455	135962
2028	3507	134598	138105
2029	3507	136774	140281
2030	3507	138983	142490
2031	3507	141227	144734
2032	3507	143506	147013
2033	3507	145822	149329
2034	3507	148176	151683
2035	3507	150571	154078
2036	3507	153007	156514
2037	3507	155488	158995
2038	3507	158014	161521
2039	3507	160589	164096
2040	3507	163214	166721
2041	3507	165894	169401
2042	3507	168630	172137
2043	3507	171427	174934
2044	3507	174287	177794
2045	3507	177216	180723
2046	3507	180217	183724
2047	3507	183296	186803
2048	3507	186458	189965
2049	3507	189710	193217
2050	3507	193058	196565
2051	3507	196510	200017



10.8.1.29 Expected Staff to Vehicle Ratio

Expected Staff to Vehicle Ratio

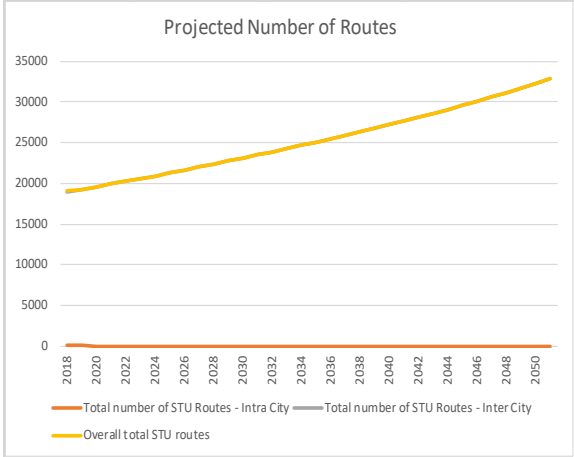
Year	Staff to vehicle ratio - Intra city service	Staff to vehicle ratio - Inter city service
2018	6.24	6.24
2019	6.24	6.24
2020	6.24	6.24
2021	6.24	6.24
2022	6.24	6.24
2023	6.24	6.24
2024	6.24	6.24
2025	6.24	6.24
2026	6.24	6.24
2027	6.24	6.24
2028	6.24	6.24
2029	6.24	6.24
2030	6.24	6.24
2031	6.24	6.24
2032	6.24	6.24
2033	6.24	6.24
2034	6.24	6.24
2035	6.24	6.24
2036	6.24	6.24
2037	6.24	6.24
2038	6.24	6.24
2039	6.24	6.24
2040	6.24	6.24
2041	6.24	6.24
2042	6.24	6.24
2043	6.24	6.24
2044	6.24	6.24
2045	6.24	6.24
2046	6.24	6.24
2047	6.24	6.24
2048	6.24	6.24
2049	6.24	6.24
2050	6.24	6.24
2051	6.24	6.24



10.8.1.30 Projected Number of Routes

Projected Number of Routes

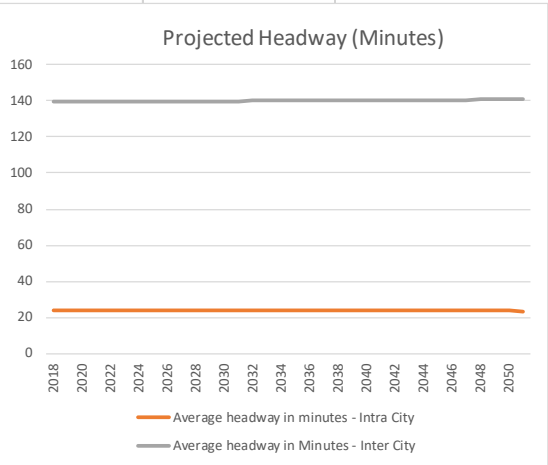
Year	Total number of STU Routes - Intra City	Total number of STU Routes - Inter City	Overall total STU routes
2018	87	19006	19093
2019	30	19273	19303
2020	10	19597	19607
2021	4	19925	19929
2022	1	20258	20260
2023	0	20596	20596
2024	0	20938	20938
2025	0	21285	21285
2026	0	21638	21638
2027	0	21995	21995
2028	0	22358	22358
2029	0	22726	22726
2030	0	23100	23100
2031	0	23480	23480
2032	0	23866	23866
2033	0	24258	24258
2034	0	24657	24657
2035	0	25063	25063
2036	0	25477	25477
2037	0	25897	25897
2038	0	26326	26326
2039	0	26763	26763
2040	0	27209	27209
2041	0	27664	27664
2042	0	28128	28128
2043	0	28603	28603
2044	0	29089	29089
2045	0	29587	29587
2046	0	30097	30097
2047	0	30621	30621
2048	0	31158	31158
2049	0	31711	31711
2050	0	32281	32281
2051	0	32868	32868



10.8.1.31 Projected Headway (Minutes)

Projected Headway (Minutes)

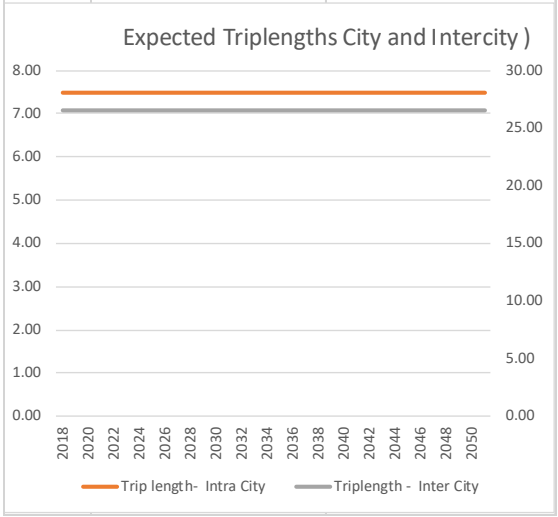
Year	Average headway in minutes - Intra City	Average headway in Minutes - Inter City
2018	24	139
2019	24	139
2020	24	139
2021	24	140
2022	24	140
2023	24	140
2024	24	140
2025	24	140
2026	24	140
2027	24	140
2028	24	140
2029	24	140
2030	24	140
2031	24	140
2032	24	140
2033	24	140
2034	24	140
2035	24	140
2036	24	140
2037	24	140
2038	24	140
2039	24	140
2040	24	140
2041	24	140
2042	24	140
2043	24	140
2044	24	140
2045	24	141
2046	24	141
2047	24	141
2048	24	141
2049	24	141
2050	24	141
2051	24	141



10.8.1.32 Expected Triplengths City and Intercity

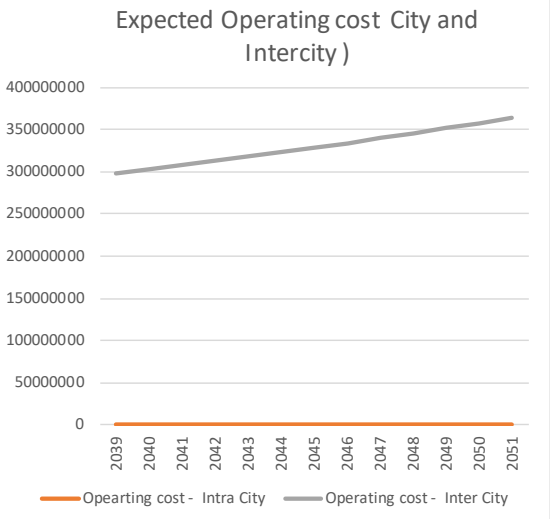
Expected Triplengths City and Intercity

Year	Trip length- Intra City	Triplength - Inter City
2018	7.48	26.57
2019	7.48	26.57
2020	7.48	26.57
2021	7.48	26.57
2022	7.48	26.57
2023	7.48	26.57
2024	7.48	26.57
2025	7.48	26.57
2026	7.48	26.57
2027	7.48	26.57
2028	7.48	26.57
2029	7.48	26.57
2030	7.48	26.57
2031	7.48	26.57
2032	7.48	26.57
2033	7.48	26.57
2034	7.48	26.57
2035	7.48	26.57
2036	7.48	26.57
2037	7.48	26.57
2038	7.48	26.57
2039	7.48	26.57
2040	7.48	26.57
2041	7.48	26.57
2042	7.48	26.57
2043	7.48	26.57
2044	7.48	26.57
2045	7.48	26.57
2046	7.48	26.57
2047	7.48	26.57
2048	7.48	26.57
2049	7.48	26.57
2050	7.48	26.57
2051	7.48	26.57



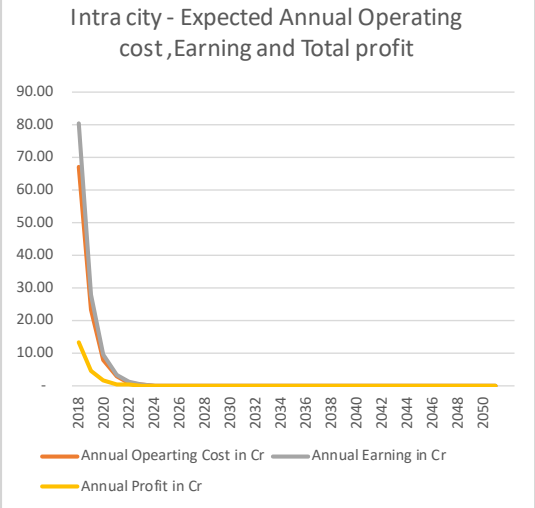
10.8.1.33 Expected Operating cost intraCity and Intercity

Expected Operating cost City and Intercity		
Year	Opearting cost - Intra City	Operating cost - Inter City
2018	1834183	212759936
2019	635302	215681193
2020	220662	219242840
2021	76643	222850859
2022	26620	226506628
2023	9246	230211572
2024	3211	233967172
2025	1115	237774975
2026	387	241636606
2027	135	245553782
2028	47	249528324
2029	16	253562171
2030	6	257657397
2031	2	261816227
2032	1	266041059
2033	0	270334482
2034	0	274699297
2035	0	279138551
2036	0	283655557
2037	0	288253930
2038	0	292937620
2039	0	297710955
2040	0	302578676
2041	0	307545997
2042	0	312618647
2043	0	317802938
2044	0	323105826
2045	0	328534989
2046	0	334098907
2047	0	339806955
2048	0	345669503
2049	0	351698034
2050	0	357905264
2051	0	364305291



10.8.1.34 Intra city - Expected Annual Operating cost, Earning and Total profit

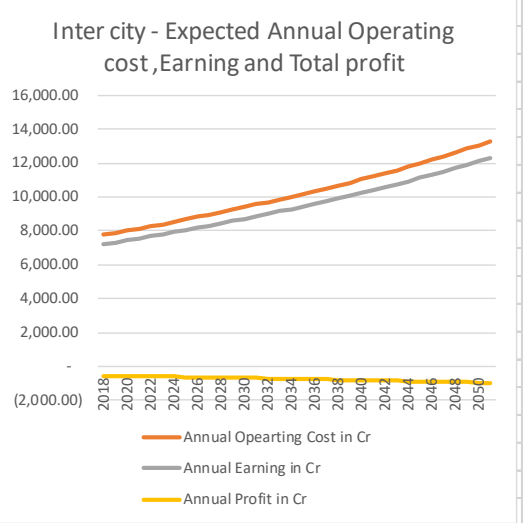
tra city - Expected Annual Operating cost ,Earning and Total prof			
Year	Annual Opearting Cost in Cr	Annual Earning in Cr	Annual Profit in Cr
2018	66.95	80.32	13.37
2019	23.19	27.89	4.70
2020	8.05	9.69	1.63
2021	2.80	3.36	0.57
2022	0.97	1.17	0.20
2023	0.34	0.41	0.07
2024	0.12	0.14	0.02
2025	0.04	0.05	0.01
2026	0.01	0.02	0.00
2027	0.00	0.01	0.00
2028	0.00	0.00	0.00
2029	0.00	0.00	0.00
2030	0.00	0.00	0.00
2031	0.00	0.00	0.00
2032	0.00	0.00	0.00
2033	0.00	0.00	0.00
2034	0.00	0.00	0.00
2035	0.00	0.00	0.00
2036	0.00	0.00	0.00
2037	0.00	0.00	0.00
2038	0.00	0.00	0.00
2039	0.00	0.00	0.00
2040	0.00	0.00	0.00
2041	0.00	0.00	0.00
2042	0.00	0.00	0.00
2043	0.00	0.00	0.00
2044	0.00	0.00	0.00
2045	0.00	0.00	0.00
2046	0.00	0.00	0.00
2047	0.00	0.00	0.00
2048	0.00	0.00	0.00
2049	0.00	0.00	0.00
2050	0.00	0.00	0.00
2051	0.00	0.00	0.00



10.8.1.35 Intercity - Expected Annual Operating cost, Earning and Total profit

er city - Expected Annual Operating cost ,Earning and Total pro

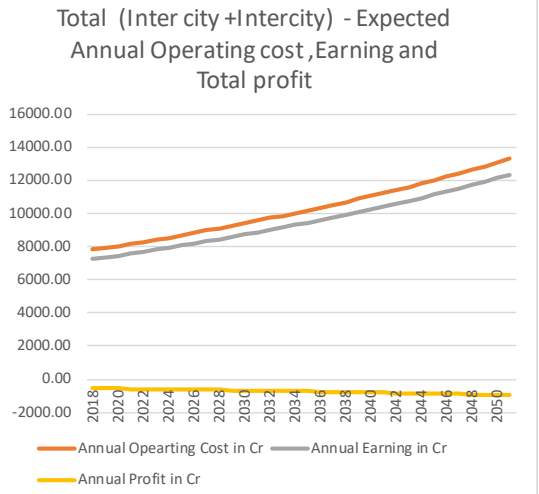
Year	Annual Opearting Cost in Cr	Annual Earning in Cr	Annual Profit in Cr
2018	7,765.74	7,197.84	-567.89
2019	7,872.36	7,315.25	-557.11
2020	8,002.36	7,434.31	-568.05
2021	8,134.06	7,555.05	-579.01
2022	8,267.49	7,677.51	-589.98
2023	8,402.72	7,801.73	-601.00
2024	8,539.80	7,927.75	-612.06
2025	8,678.79	8,055.61	-623.17
2026	8,819.74	8,185.38	-634.36
2027	8,962.71	8,317.09	-645.63
2028	9,107.78	8,450.80	-656.98
2029	9,255.02	8,586.58	-668.44
2030	9,404.49	8,724.49	-680.01
2031	9,556.29	8,864.59	-691.70
2032	9,710.50	9,006.98	-703.52
2033	9,867.21	9,151.73	-715.48
2034	10,026.52	9,298.93	-727.59
2035	10,188.56	9,448.69	-739.87
2036	10,353.43	9,601.11	-752.32
2037	10,521.27	9,756.31	-764.96
2038	10,692.22	9,914.43	-777.79
2039	10,866.45	10,075.60	-790.85
2040	11,044.12	10,240.00	-804.13
2041	11,225.43	10,407.78	-817.65
2042	11,410.58	10,579.15	-831.43
2043	11,599.81	10,754.31	-845.50
2044	11,793.36	10,933.50	-859.86
2045	11,991.53	11,116.98	-874.54
2046	12,194.61	11,305.04	-889.57
2047	12,402.95	11,497.98	-904.97
2048	12,616.94	11,696.17	-920.77
2049	12,836.98	11,899.98	-937.00
2050	13,063.54	12,109.84	-953.70
2051	13,297.14	12,326.24	-970.90



10.8.1.36 Total (Intracity +Intercity) - Expected Annual Operating cost ,Earning and Total profit

r city +Intercity) - Expected Annual Operating cost ,Earning and T

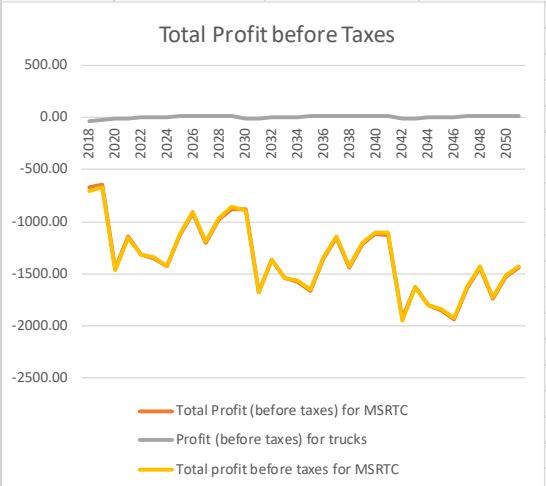
Year	Annual Opearting Cost in Cr	Annual Earning in Cr	Annual Profit in Cr
2018	7832.69	7278.17	-554.52
2019	7895.55	7343.14	-552.41
2020	8010.42	7443.99	-566.42
2021	8136.85	7558.41	-578.44
2022	8268.46	7678.68	-589.79
2023	8403.06	7802.13	-600.93
2024	8539.92	7927.89	-612.03
2025	8678.83	8055.66	-623.16
2026	8819.75	8185.39	-634.36
2027	8962.72	8317.09	-645.63
2028	9107.79	8450.80	-656.98
2029	9255.02	8586.58	-668.44
2030	9404.50	8724.49	-680.01
2031	9556.29	8864.59	-691.70
2032	9710.50	9006.98	-703.52
2033	9867.21	9151.73	-715.48
2034	10026.52	9298.93	-727.59
2035	10188.56	9448.69	-739.87
2036	10353.43	9601.11	-752.32
2037	10521.27	9756.31	-764.96
2038	10692.22	9914.43	-777.79
2039	10866.45	10075.60	-790.85
2040	11044.12	10240.00	-804.13
2041	11225.43	10407.78	-817.65
2042	11410.58	10579.15	-831.43
2043	11599.81	10754.31	-845.50
2044	11793.36	10933.50	-859.86
2045	11991.53	11116.98	-874.54
2046	12194.61	11305.04	-889.57
2047	12402.95	11497.98	-904.97
2048	12616.94	11696.17	-920.77
2049	12836.98	11899.98	-937.00
2050	13063.54	12109.84	-953.70
2051	13297.14	12326.24	-970.90



10.8.1.37 Profit before taxes after Infrastructure development and Fleet Upgradation cost

Profit before taxes after Infrastrucuture development and Fleet Upgradation cost

Year	Total Profit (before taxes) for MSRTC	Profit (before taxes) for trucks	Total profit before taxes for MSRTC
2018	-676.27	-32.25	-708.52
2019	-649.13	-19.54	-668.68
2020	-1456.91	-11.78	-1468.69
2021	-1146.71	-5.49	-1152.20
2022	-1319.72	-0.43	-1320.15
2023	-1351.52	3.63	-1347.90
2024	-1431.90	6.91	-1424.99
2025	-1124.37	9.63	-1114.74
2026	-919.90	11.82	-908.08
2027	-1206.53	13.52	-1193.01
2028	-978.27	14.93	-963.34
2029	-877.76	16.06	-861.70
2030	-875.79	-16.11	-891.90
2031	-1675.34	-6.39	-1681.72
2032	-1366.54	-0.95	-1367.48
2033	-1541.83	3.31	-1538.52
2034	-1576.36	6.90	-1569.47
2035	-1659.75	9.62	-1650.12
2036	-1355.45	11.68	-1343.77
2037	-1154.45	13.57	-1140.88
2038	-1444.78	15.11	-1429.67
2039	-1220.46	16.14	-1204.32
2040	-1124.15	17.17	-1106.98
2041	-1126.67	17.85	-1108.82
2042	-1931.01	-14.68	-1945.69
2043	-1627.32	-5.25	-1632.57
2044	-1808.09	-0.04	-1808.13
2045	-1848.48	4.20	-1844.28
2046	-1938.14	7.61	-1930.54
2047	-1640.59	10.20	-1630.39
2048	-1446.85	12.15	-1434.70
2049	-1745.00	13.94	-1731.07
2050	-1529.13	15.40	-1513.73
2051	-1441.95	16.37	-1,425.57

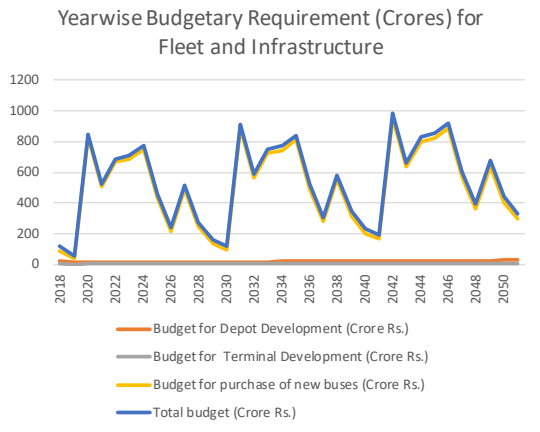


10.8.2 Mode share retain

10.8.2.1 Yearwise Budgetary Requirement (Crores) for Fleet and Infrastructure

Yearwise Budgetary Requirement (Crores) for Fleet and Infrastructure

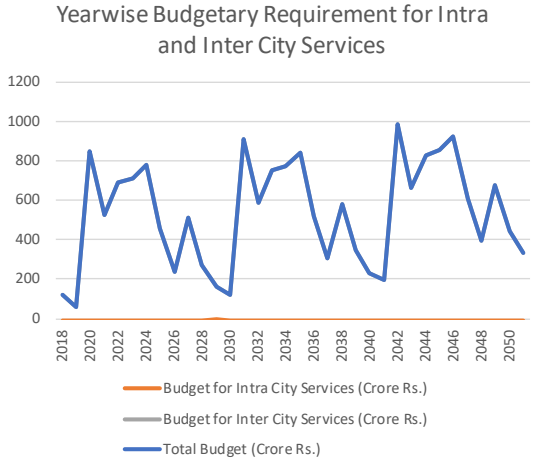
Year	Budget for Depot Development (Crore Rs.)	Budget for Terminal Development (Crore Rs.)	Budget for purchase of new buses (Crore Rs.)	Total budget (Crore Rs.)
2018	25	8	88	122
2019	12	4	42	57
2020	16	5	829	850
2021	16	5	506	527
2022	17	5	667	688
2023	17	5	686	708
2024	17	5	754	777
2025	17	5	435	457
2026	17	5	218	241
2027	18	5	492	515
2028	18	6	252	275
2029	18	6	139	162
2030	18	6	99	123
2031	19	6	885	910
2032	19	6	563	588
2033	19	6	725	750
2034	19	6	745	771
2035	20	6	815	841
2036	20	6	496	522
2037	20	6	280	307
2038	21	7	556	583
2039	21	7	317	344
2040	22	7	205	233
2041	22	7	167	196
2042	23	7	955	984
2043	23	7	634	664
2044	24	7	797	829
2045	24	8	820	852
2046	25	8	891	924
2047	26	8	575	609
2048	26	8	362	396
2049	27	8	640	676
2050	28	9	403	440
2051	29	9	295	333



10.8.2.2 Year Wise Budgetary Requirement for Intra and Inter City Services

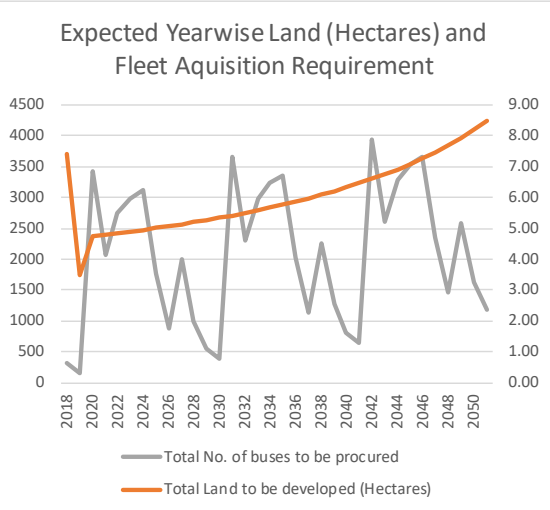
Year Wise Budgetary Requirement for Intra and Inter City Services

Year	Budget for Intra City Services (Crore Rs.)	Budget for Inter City Services (Crore Rs.)	Total Budget (Crore Rs.)
2018	0	122	122
2019	0	57	57
2020	0	850	850
2021	0	527	527
2022	0	688	688
2023	0	708	708
2024	0	777	777
2025	0	457	457
2026	0	241	241
2027	0	515	515
2028	0	275	275
2029	0	162	162
2030	0	123	123
2031	0	910	910
2032	0	588	588
2033	0	750	750
2034	0	771	771
2035	0	841	841
2036	0	522	522
2037	0	307	307
2038	0	583	583
2039	0	344	344
2040	0	233	233
2041	0	196	196
2042	0	984	984
2043	0	664	664
2044	0	829	829
2045	0	852	852
2046	0	924	924
2047	0	609	609
2048	0	396	396
2049	0	676	676
2050	0	440	440
2051	0	333	333



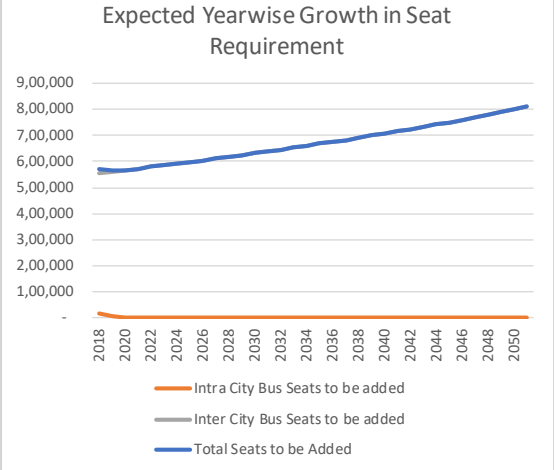
10.8.2.3 Expected Year wise Land (Hectares) and Fleet Acquisition Requirement

Expected Yearwise Land (Hectares) and Fleet Aquisition Requirement		
Year	Total Land to be developed (Hectares)	Total No. of buses to be procured
2018	7.42	318
2019	3.49	149
2020	4.74	3422
2021	4.79	2075
2022	4.84	2738
2023	4.89	2990
2024	4.95	3110
2025	5.01	1777
2026	5.07	874
2027	5.13	1994
2028	5.20	1005
2029	5.27	544
2030	5.34	378
2031	5.42	3654
2032	5.50	2311
2033	5.58	2977
2034	5.67	3232
2035	5.76	3357
2036	5.86	2029
2037	5.97	1130
2038	6.08	2254
2039	6.19	1270
2040	6.32	814
2041	6.45	655
2042	6.59	3936
2043	6.74	2599
2044	6.91	3273
2045	7.08	3536
2046	7.27	3668
2047	7.47	2349
2048	7.69	1459
2049	7.93	2594
2050	8.18	1620
2051	8.46	1177



10.8.2.4 Expected Year wise Growth in Seat Requirement

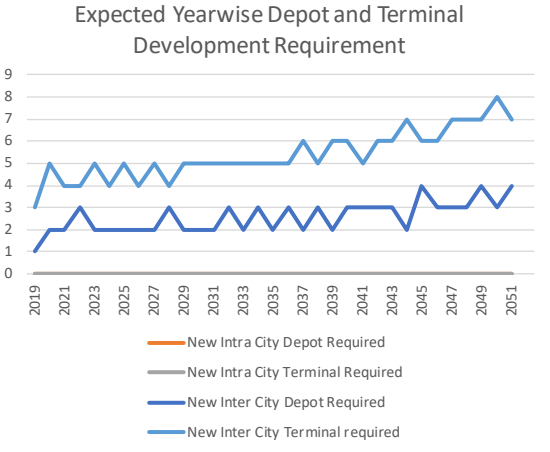
Expected Yearwise Growth in Seat Requirement			
Year	Intra City Bus Seats to be added	Inter City Bus Seats to be added	Total Seats to be Added
2018	16,032	5,55,796	5,71,828
2019	5,553	5,60,311	5,65,864
2020	1,929	5,66,443	5,68,372
2021	670	5,72,639	5,73,309
2022	233	5,78,902	5,79,135
2023	81	5,85,235	5,85,316
2024	28	5,91,641	5,91,669
2025	10	5,98,123	5,98,133
2026	3	6,04,684	6,04,688
2027	1	6,11,328	6,11,329
2028	0	6,18,058	6,18,059
2029	0	6,24,879	6,24,879
2030	0	6,31,794	6,31,794
2031	0	6,38,807	6,38,807
2032	0	6,45,925	6,45,925
2033	0	6,53,151	6,53,151
2034	0	6,60,491	6,60,491
2035	0	6,67,952	6,67,952
2036	0	6,75,541	6,75,541
2037	0	6,83,264	6,83,264
2038	0	6,91,129	6,91,129
2039	0	6,99,146	6,99,146
2040	0	7,07,323	7,07,323
2041	0	7,15,672	7,15,672
2042	0	7,24,205	7,24,205
2043	0	7,32,933	7,32,933
2044	0	7,41,871	7,41,871
2045	0	7,51,036	7,51,036
2046	0	7,60,443	7,60,443
2047	0	7,70,113	7,70,113
2048	0	7,80,065	7,80,065
2049	0	7,90,325	7,90,325
2050	0	8,00,916	8,00,916
2051	0	8,11,869	8,11,869



10.8.2.5 Expected Yearwise Depot and Terminal Development Requirement

Expected Yearwise Depot and Terminal Development Requirement

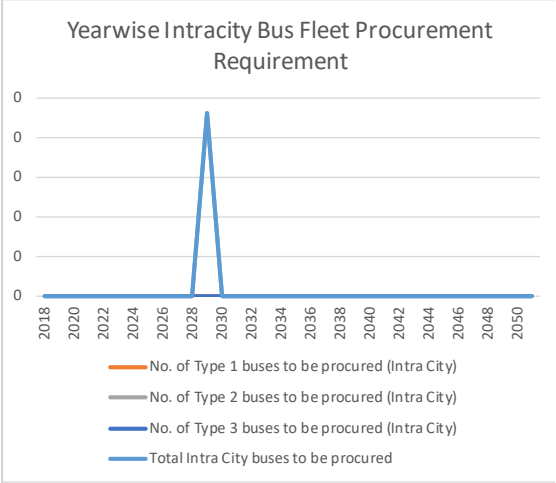
Year	New Intra City Depot Required	New Intra City Terminal Required	New Inter City Depot Required	New Inter City Terminal required
2018	0	0	3	6
2019	0	0	1	3
2020	0	0	2	5
2021	0	0	2	4
2022	0	0	3	4
2023	0	0	2	5
2024	0	0	2	4
2025	0	0	2	5
2026	0	0	2	4
2027	0	0	2	5
2028	0	0	3	4
2029	0	0	2	5
2030	0	0	2	5
2031	0	0	2	5
2032	0	0	3	5
2033	0	0	2	5
2034	0	0	3	5
2035	0	0	2	5
2036	0	0	3	5
2037	0	0	2	6
2038	0	0	3	5
2039	0	0	2	6
2040	0	0	3	6
2041	0	0	3	5
2042	0	0	3	6
2043	0	0	3	6
2044	0	0	2	7
2045	0	0	4	6
2046	0	0	3	6
2047	0	0	3	7
2048	0	0	3	7
2049	0	0	4	7
2050	0	0	3	8
2051	0	0	4	7



10.8.2.6 Yearwise Intracity Bus Fleet Procurement Requirement

Yearwise Intracity Bus Fleet Procurement Requirement

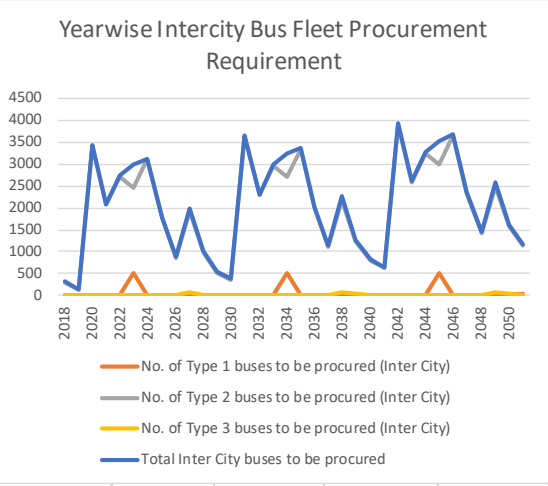
Year	No. of Type 1 buses to be procured (Intra City)	No. of Type 2 buses to be procured (Intra City)	No. of Type 3 buses to be procured (Intra City)	Total Intra City buses to be procured
2018	0	0	0	0
2019	0	0	0	0
2020	0	0	0	0
2021	0	0	0	0
2022	0	0	0	0
2023	0	0	0	0
2024	0	0	0	0
2025	0	0	0	0
2026	0	0	0	0
2027	0	0	0	0
2028	0	0	0	0
2029	0	0	0	0
2030	0	0	0	0
2031	0	0	0	0
2032	0	0	0	0
2033	0	0	0	0
2034	0	0	0	0
2035	0	0	0	0
2036	0	0	0	0
2037	0	0	0	0
2038	0	0	0	0
2039	0	0	0	0
2040	0	0	0	0
2041	0	0	0	0
2042	0	0	0	0
2043	0	0	0	0
2044	0	0	0	0
2045	0	0	0	0
2046	0	0	0	0
2047	0	0	0	0
2048	0	0	0	0
2049	0	0	0	0
2050	0	0	0	0
2051	0	0	0	0



10.8.2.7 Yearwise Intercity Bus Fleet Procurement Requirement

Yearwise Intercity Bus Fleet Procurement Requirement

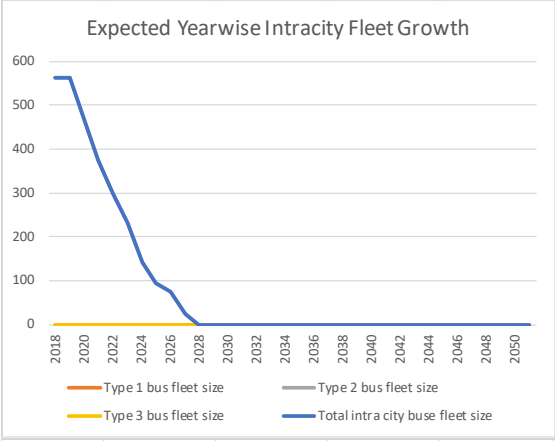
Year	No. of Type 1 buses to be procured (Inter City)	No. of Type 2 buses to be procured (Inter City)	No. of Type 3 buses to be procured (Inter City)	Total Inter City buses to be procured
2018	9	307	2	318
2019	4	144	1	149
2020	6	3415	1	3422
2021	6	2068	1	2075
2022	6	2713	19	2738
2023	513	2459	17	2990
2024	6	3103	1	3110
2025	6	1770	2	1777
2026	6	866	2	874
2027	6	1918	70	1994
2028	6	972	27	1005
2029	15	524	4	544
2030	11	365	3	378
2031	12	3639	3	3654
2032	12	2295	3	2311
2033	13	2944	21	2977
2034	520	2694	19	3232
2035	13	3341	3	3357
2036	13	2012	3	2029
2037	13	1113	3	1130
2038	13	2169	71	2254
2039	14	1228	28	1270
2040	23	786	6	814
2041	18	632	5	655
2042	20	3911	5	3936
2043	20	2574	5	2599
2044	21	3229	23	3273
2045	528	2986	21	3536
2046	22	3641	5	3668
2047	22	2321	6	2349
2048	22	1431	6	1459
2049	23	2497	74	2594
2050	24	1566	31	1620
2051	33	1135	8	1177



10.8.2.8 Expected Yearwise Intracity Fleet Growth

Expected Yearwise Intracity Fleet Growth

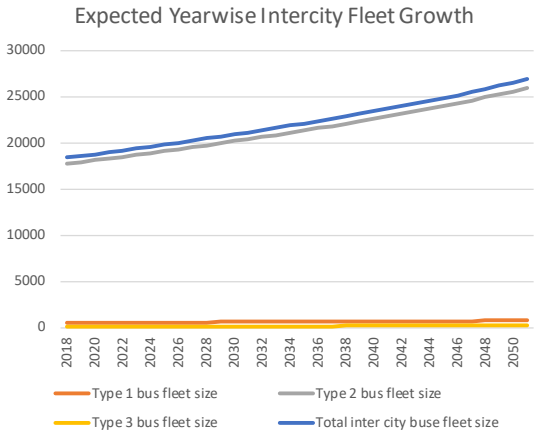
Year	Type 1 bus fleet size	Type 2 bus fleet size	Type 3 bus fleet size	Total intra city buse fleet size
2018	0	562	0	562
2019	0	562	0	562
2020	0	464	0	464
2021	0	376	0	376
2022	0	300	0	300
2023	0	231	0	231
2024	0	143	0	143
2025	0	95	0	95
2026	0	75	0	75
2027	0	23	0	23
2028	0	0	0	0
2029	0	0	0	0
2030	0	0	0	0
2031	0	0	0	0
2032	0	0	0	0
2033	0	0	0	0
2034	0	0	0	0
2035	0	0	0	0
2036	0	0	0	0
2037	0	0	0	0
2038	0	0	0	0
2039	0	0	0	0
2040	0	0	0	0
2041	0	0	0	0
2042	0	0	0	0
2043	0	0	0	0
2044	0	0	0	0
2045	0	0	0	0
2046	0	0	0	0
2047	0	0	0	0
2048	0	0	0	0
2049	0	0	0	0
2050	0	0	0	0
2051	0	0	0	0



10.8.2.9 Expected Yearwise Intercity Fleet Growth

Expected Yearwise Intercity Fleet Growth

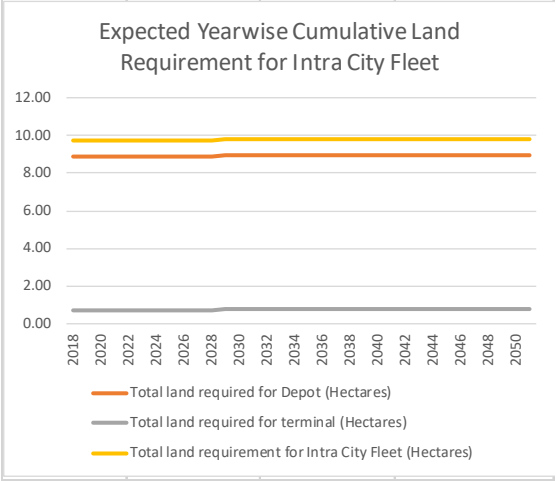
Year	Type 1 bus fleet size	Type 2 bus fleet size	Type 3 bus fleet size	Total inter city buse fleet size
2018	516	17747	129	18392
2019	520	17891	130	18541
2020	526	18087	132	18744
2021	532	18284	133	18949
2022	537	18484	135	19156
2023	543	18687	136	19366
2024	549	18891	138	19578
2025	555	19098	139	19793
2026	561	19308	141	20010
2027	567	19520	142	20229
2028	574	19735	144	20452
2029	580	19953	145	20678
2030	586	20173	147	20907
2031	593	20397	149	21139
2032	600	20624	150	21374
2033	606	20855	152	21613
2034	613	21090	154	21856
2035	620	21328	155	22103
2036	627	21570	157	22354
2037	634	21817	159	22610
2038	642	22068	161	22870
2039	649	22324	163	23135
2040	657	22585	164	23406
2041	664	22852	166	23682
2042	672	23124	168	23965
2043	680	23403	170	24253
2044	689	23688	173	24549
2045	697	23981	175	24853
2046	706	24281	177	25164
2047	715	24590	179	25484
2048	724	24908	181	25813
2049	734	25235	184	26153
2050	743	25573	186	26503
2051	754	25923	189	26866



10.8.2.10 Expected Yearwise Cumulative Land Requirement for Intra City Fleet

Expected Yearwise Cumulative Land Requirement for Intra City Fleet

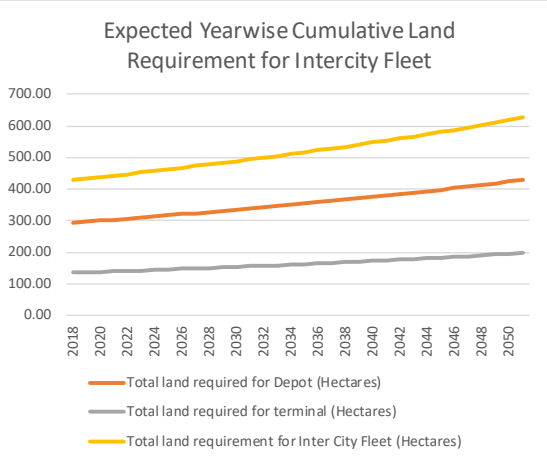
Year	Total land required for Depot (Hectares)	Total land required for terminal (Hectares)	Total land requirement for Intra City Fleet (Hectares)
2018	8.99	0.79	9.78
2019	8.99	0.79	9.78
2020	8.99	0.79	9.78
2021	8.99	0.79	9.78
2022	8.99	0.79	9.78
2023	8.99	0.79	9.78
2024	8.99	0.79	9.78
2025	8.99	0.79	9.78
2026	8.99	0.79	9.78
2027	8.99	0.79	9.78
2028	8.99	0.79	9.78
2029	8.99	0.79	9.78
2030	8.99	0.79	9.78
2031	8.99	0.79	9.78
2032	8.99	0.79	9.78
2033	8.99	0.79	9.78
2034	8.99	0.79	9.78
2035	8.99	0.79	9.78
2036	8.99	0.79	9.78
2037	8.99	0.79	9.78
2038	8.99	0.79	9.78
2039	8.99	0.79	9.78
2040	8.99	0.79	9.78
2041	8.99	0.79	9.78
2042	8.99	0.79	9.78
2043	8.99	0.79	9.78
2044	8.99	0.79	9.78
2045	8.99	0.79	9.78
2046	8.99	0.79	9.78
2047	8.99	0.79	9.78
2048	8.99	0.79	9.78
2049	8.99	0.79	9.78
2050	8.99	0.79	9.78
2051	8.99	0.79	9.78



10.8.2.11 Expected Yearwise Cumulative Land Requirement for Intercity Fleet

Expected Yearwise Cumulative Land Requirement for Intercity Fleet

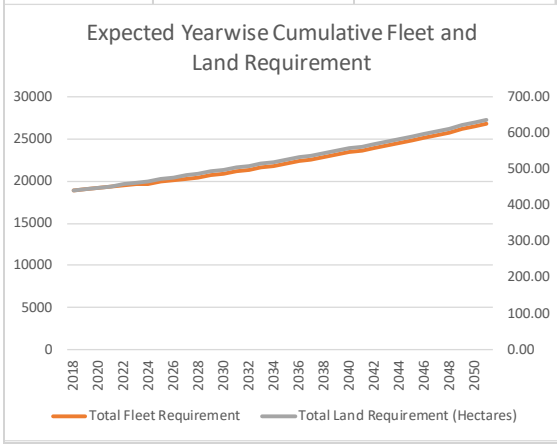
Year	Total land required for Depot (Hectares)	Total land required for terminal (Hectares)	Total land requirement for Inter City Fleet (Hectares)
2018	294.27	135.18	429.45
2019	296.66	136.28	432.94
2020	299.91	137.77	437.68
2021	303.19	139.28	442.46
2022	306.50	140.80	447.30
2023	309.86	142.34	452.20
2024	313.25	143.90	457.15
2025	316.68	145.47	462.15
2026	320.15	147.07	467.22
2027	323.67	148.69	472.36
2028	327.23	150.32	477.56
2029	330.85	151.98	482.83
2030	334.51	153.66	488.17
2031	338.22	155.37	493.59
2032	341.99	157.10	499.09
2033	345.81	158.86	504.67
2034	349.70	160.64	510.35
2035	353.65	162.46	516.11
2036	357.67	164.30	521.97
2037	361.76	166.18	527.94
2038	365.92	168.10	534.02
2039	370.17	170.05	540.21
2040	374.50	172.03	546.53
2041	378.92	174.07	552.98
2042	383.43	176.14	559.58
2043	388.06	178.26	566.32
2044	392.79	180.44	573.23
2045	397.64	182.67	580.31
2046	402.62	184.95	587.58
2047	407.74	187.31	595.05
2048	413.01	189.73	602.74
2049	418.44	192.22	610.66
2050	424.05	194.80	618.85
2051	429.85	197.46	627.31



10.8.2.12 Expected Yearwise Cumulative Fleet and Land Requirement

Expected Yearwise Cumulative Fleet and Land Requirement

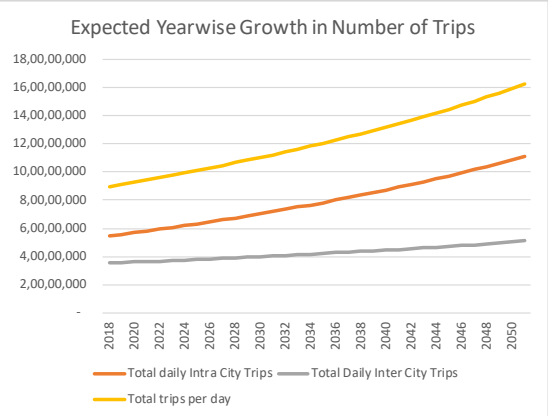
Year	Total Fleet Requirement	Total Land Requirement (Hectares)
2018	18954	439.23
2019	19103	442.72
2020	19208	447.46
2021	19325	452.24
2022	19456	457.08
2023	19597	461.98
2024	19721	466.93
2025	19888	471.93
2026	20085	477.00
2027	20252	482.14
2028	20452	487.34
2029	20678	492.61
2030	20907	497.95
2031	21139	503.37
2032	21374	508.87
2033	21613	514.45
2034	21856	520.12
2035	22103	525.89
2036	22354	531.75
2037	22610	537.72
2038	22870	543.80
2039	23135	549.99
2040	23406	556.31
2041	23682	562.76
2042	23965	569.35
2043	24253	576.10
2044	24549	583.00
2045	24853	590.09
2046	25164	597.35
2047	25484	604.83
2048	25813	612.52
2049	26153	620.44
2050	26503	628.63
2051	26866	637.09



10.8.2.13 Expected Yearwise Growth in Number of Trips

Expected Yearwise Growth in Number of Trips

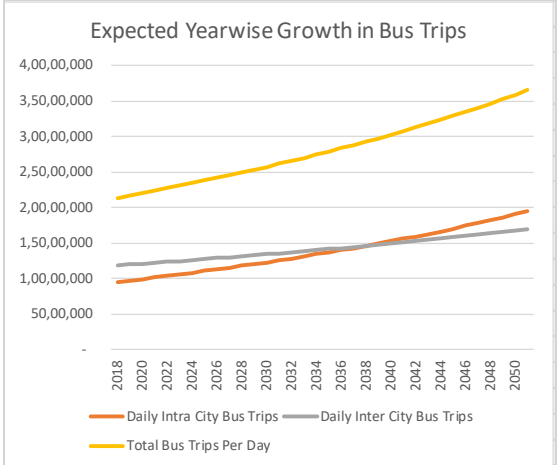
Year	Total daily Intra City Trips	Total Daily Inter City Trips	Total trips per day
2018	5,45,45,370	3,52,89,150	8,98,34,520
2019	5,57,08,018	3,56,52,052	9,13,60,070
2020	5,68,96,013	3,60,19,270	9,29,15,283
2021	5,81,09,971	3,63,90,917	9,45,00,888
2022	5,93,50,528	3,67,67,118	9,61,17,646
2023	6,06,18,346	3,71,48,005	9,77,66,351
2024	6,19,14,109	3,75,33,723	9,94,47,832
2025	6,32,38,527	3,79,24,429	10,11,62,956
2026	6,45,92,341	3,83,20,292	10,29,12,633
2027	6,59,76,320	3,87,21,499	10,46,97,819
2028	6,73,91,266	3,91,28,252	10,65,19,518
2029	6,88,38,018	3,95,40,769	10,83,78,787
2030	7,03,17,451	3,99,59,294	11,02,76,745
2031	7,18,30,481	4,03,84,088	11,22,14,569
2032	7,33,78,070	4,08,15,442	11,41,93,512
2033	7,49,61,226	4,12,53,671	11,62,14,897
2034	7,65,81,010	4,16,99,125	11,82,80,135
2035	7,82,38,539	4,21,52,185	12,03,90,724
2036	7,99,34,994	4,26,13,272	12,25,48,266
2037	8,16,71,621	4,30,82,850	12,47,54,471
2038	8,34,49,739	4,35,61,428	12,70,11,167
2039	8,52,70,749	4,40,49,570	12,93,20,319
2040	8,71,36,138	4,45,47,896	13,16,84,034
2041	8,90,47,490	4,50,57,093	13,41,04,583
2042	9,10,06,493	4,55,77,916	13,65,84,409
2043	9,30,14,951	4,61,11,205	13,91,26,156
2044	9,50,74,794	4,66,57,883	14,17,32,677
2045	9,71,88,092	4,72,18,975	14,44,07,067
2046	9,93,57,068	4,77,95,614	14,71,52,682
2047	10,15,84,111	4,83,89,054	14,99,73,165
2048	10,38,71,799	4,90,00,684	15,28,72,483
2049	10,62,22,912	4,96,32,043	15,58,54,955
2050	10,86,40,455	5,02,84,837	15,89,25,292
2051	11,11,27,684	5,09,60,955	16,20,88,639



10.8.2.14 Expected Yearwise Growth in Bus Trips

Expected Yearwise Growth in Bus Trips

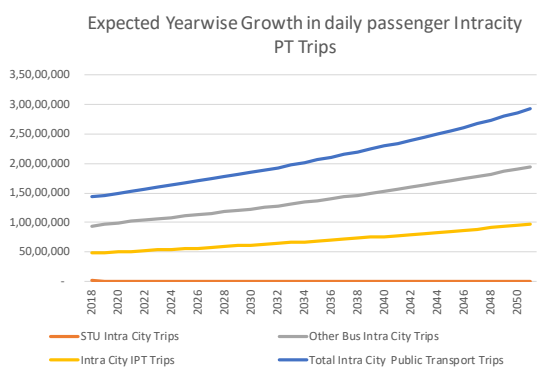
Year	Daily Intra City Bus Trips	Daily Inter City Bus Trips	Total Bus Trips Per Day
2018	95,58,292	1,18,56,074	2,14,14,367
2019	97,63,227	1,19,79,318	2,17,42,545
2020	99,71,907	1,21,03,986	2,20,75,893
2021	1,01,84,903	1,22,30,112	2,24,15,015
2022	1,04,02,488	1,23,57,730	2,27,60,218
2023	1,06,24,835	1,24,86,877	2,31,11,712
2024	1,08,52,086	1,26,17,591	2,34,69,677
2025	1,10,84,373	1,27,49,916	2,38,34,289
2026	1,13,21,831	1,28,83,898	2,42,05,728
2027	1,15,64,597	1,30,19,585	2,45,84,182
2028	1,18,12,815	1,31,57,033	2,49,69,847
2029	1,20,66,634	1,32,96,299	2,53,62,932
2030	1,23,26,211	1,34,37,446	2,57,63,657
2031	1,25,91,710	1,35,80,545	2,61,72,255
2032	1,28,63,303	1,37,25,669	2,65,88,973
2033	1,31,41,172	1,38,72,902	2,70,14,074
2034	1,34,25,506	1,40,22,333	2,74,47,840
2035	1,37,16,508	1,41,74,061	2,78,90,569
2036	1,40,14,388	1,43,28,193	2,83,42,582
2037	1,43,19,373	1,44,84,848	2,88,04,222
2038	1,46,31,701	1,46,44,156	2,92,75,857
2039	1,49,51,625	1,48,06,259	2,97,57,884
2040	1,52,79,414	1,49,71,315	3,02,50,729
2041	1,56,15,356	1,51,39,496	3,07,54,852
2042	1,59,59,758	1,53,10,994	3,12,70,752
2043	1,63,12,948	1,54,86,019	3,17,98,966
2044	1,66,75,277	1,56,64,802	3,23,40,079
2045	1,70,47,123	1,58,47,601	3,28,94,724
2046	1,74,28,893	1,60,34,697	3,34,63,590
2047	1,78,21,023	1,62,26,405	3,40,47,428
2048	1,82,23,987	1,64,23,070	3,46,47,056
2049	1,86,38,293	1,66,25,074	3,52,63,367
2050	1,90,64,494	1,68,32,842	3,58,97,336
2051	1,95,03,189	1,70,46,842	3,65,50,031



10.8.2.15 Expected Yearwise Growth in daiy Intracity passenger intracity PT Trips

Expected Yearwise Growth in daiy Intracity passenger intracity PT Trips

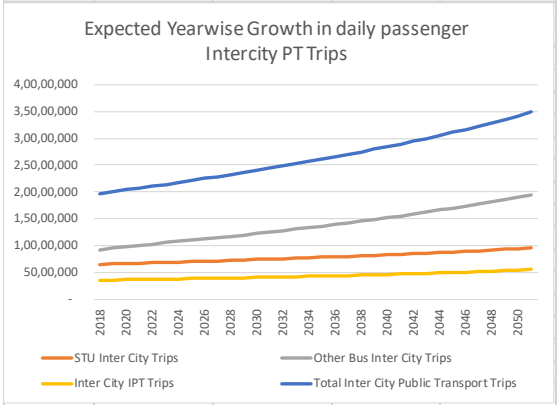
Year	STU Intra City Trips	Other Bus Intra City Trips	Intra City IPT Trips	Total Intra City Public Transport Trips
2018	2,05,857	93,52,435	47,92,296	1,43,50,588
2019	71,484	96,91,742	48,94,390	1,46,57,616
2020	24,823	99,47,080	49,98,704	1,49,70,607
2021	8,620	1,01,76,276	51,05,291	1,52,90,187
2022	2,993	1,03,99,485	52,14,206	1,56,16,684
2023	1,040	1,06,23,782	53,25,506	1,59,50,328
2024	361	1,08,51,708	54,39,250	1,62,91,319
2025	125	1,10,84,226	55,55,499	1,66,39,851
2026	44	1,13,21,761	56,74,317	1,69,96,121
2027	15	1,15,64,550	57,95,770	1,73,60,335
2028	5	1,18,12,771	59,19,926	1,77,32,703
2029	2	1,20,66,587	60,46,858	1,81,13,447
2030	1	1,23,26,158	61,76,640	1,85,02,798
2031	0	1,25,91,649	63,09,349	1,89,00,999
2032	0	1,28,63,233	64,45,069	1,93,08,302
2033	0	1,31,41,091	65,83,884	1,97,24,976
2034	0	1,34,25,414	67,25,885	2,01,51,299
2035	0	1,37,16,402	68,71,166	2,05,87,568
2036	0	1,40,14,268	70,19,827	2,10,34,094
2037	0	1,43,19,236	71,71,972	2,14,91,208
2038	0	1,46,31,545	73,27,712	2,19,59,258
2039	0	1,49,51,449	74,87,166	2,24,38,615
2040	0	1,52,79,215	76,50,457	2,29,29,672
2041	0	1,56,15,132	78,17,717	2,34,32,849
2042	0	1,59,59,505	79,89,088	2,39,48,593
2043	0	1,63,12,663	81,64,719	2,44,77,382
2044	0	1,66,74,957	83,44,771	2,50,19,728
2045	0	1,70,46,764	85,29,414	2,55,76,178
2046	0	1,74,28,490	87,18,832	2,61,47,323
2047	0	1,78,20,572	89,13,223	2,67,33,795
2048	0	1,82,23,482	91,12,798	2,73,36,279
2049	0	1,86,37,728	93,17,785	2,79,55,513
2050	0	1,90,63,862	95,28,431	2,85,92,293
2051	0	1,95,02,482	97,45,002	2,92,47,484



10.8.2.16 Expected Yearwise Growth in daily Intercity passenger intercity PT Trips

Expected Yearwise Growth in daily Intercity passenger intercity PT Trips

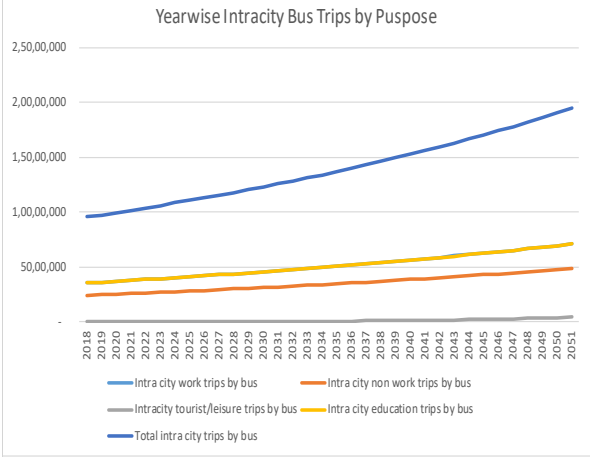
Year	STU Inter City Trips	Other Bus Inter City Trips	Inter City IPT Trips	Total Inter City Public Transport Trips
2018	65,91,623	93,52,435	36,59,886	1,96,03,944
2019	66,62,095	96,91,742	36,99,611	2,00,53,448
2020	67,33,424	99,47,080	37,39,939	2,04,20,444
2021	68,05,633	1,01,76,276	37,80,899	2,07,62,808
2022	68,78,743	1,03,99,485	38,22,520	2,11,00,748
2023	69,52,781	1,06,23,782	38,64,835	2,14,41,398
2024	70,27,772	1,08,51,708	39,07,881	2,17,87,361
2025	71,03,748	1,10,84,226	39,51,696	2,21,39,670
2026	71,80,738	1,13,21,761	39,96,326	2,24,98,824
2027	72,58,777	1,15,64,550	40,41,818	2,28,65,145
2028	73,37,903	1,18,12,771	40,88,226	2,32,38,900
2029	74,18,156	1,20,66,587	41,35,607	2,36,20,350
2030	74,99,580	1,23,26,158	41,84,028	2,40,09,767
2031	75,82,225	1,25,91,649	42,33,559	2,44,07,433
2032	76,66,142	1,28,63,233	42,84,280	2,48,13,655
2033	77,51,390	1,31,41,091	43,36,278	2,52,28,759
2034	78,38,032	1,34,25,414	43,89,649	2,56,53,094
2035	79,26,138	1,37,16,402	44,44,500	2,60,87,039
2036	80,15,784	1,40,14,268	45,00,949	2,65,31,001
2037	81,07,054	1,43,19,236	45,59,129	2,69,85,418
2038	82,00,040	1,46,31,545	46,19,182	2,74,50,768
2039	82,94,845	1,49,51,449	46,81,271	2,79,27,565
2040	83,91,581	1,52,79,215	47,45,573	2,84,16,369
2041	84,90,371	1,56,15,132	48,12,286	2,89,17,789
2042	85,91,352	1,59,59,505	48,81,628	2,94,32,485
2043	86,94,675	1,63,12,663	49,53,842	2,99,61,180
2044	88,00,505	1,66,74,957	50,29,198	3,05,04,660
2045	89,09,028	1,70,46,764	51,07,993	3,10,63,786
2046	90,20,447	1,74,28,490	51,90,559	3,16,39,497
2047	91,34,987	1,78,20,572	52,77,265	3,22,32,824
2048	92,52,898	1,82,23,482	53,68,516	3,28,44,896
2049	93,74,454	1,86,37,728	54,64,768	3,34,76,950
2050	94,99,963	1,90,63,862	55,66,521	3,41,30,346
2051	96,29,762	1,95,02,482	56,74,335	3,48,06,578



10.8.2.17 Yearwise Intracity Bus Trips by Puspose

Yearwise Intracity Bus Trips by Puspose

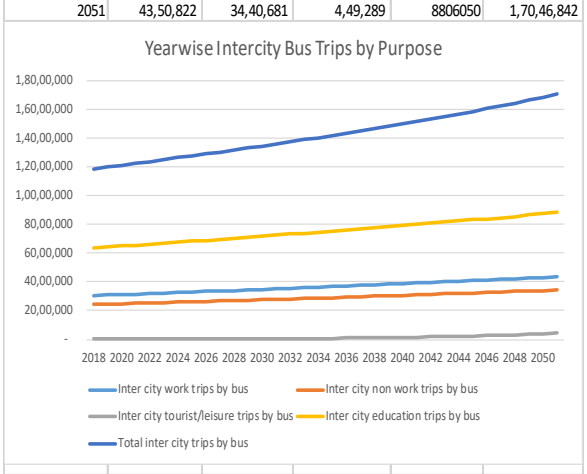
Year	Intra city work trips by bus	Intra city non work trips by bus	Intracity tourist/leisure trips by bus	Intra city education trips by bus	Total intra city trips by bus
2018	35,56,943	24,36,436	13,084	3551829	95,58,292
2019	36,32,784	24,88,367	14,542	3627534	97,63,227
2020	37,09,950	25,41,217	16,162	3704578	99,71,907
2021	37,88,653	25,95,124	17,961	3783164	1,01,84,903
2022	38,68,991	26,50,153	19,960	3863384	1,04,02,488
2023	39,51,020	27,06,340	22,182	3945294	1,06,24,835
2024	40,34,784	27,63,716	24,650	4028936	1,08,52,086
2025	41,20,322	28,22,307	27,394	4114350	1,10,84,373
2026	42,07,673	28,82,140	30,443	4201575	1,13,21,831
2027	42,96,876	29,43,242	33,831	4290648	1,15,64,597
2028	43,87,969	30,05,638	37,597	4381610	1,18,12,815
2029	44,80,994	30,69,358	41,781	4474500	1,20,66,634
2030	45,75,991	31,34,428	46,431	4569360	1,23,26,211
2031	46,73,003	32,00,878	51,599	4666230	1,25,91,710
2032	47,72,070	32,68,737	57,342	4765154	1,28,63,303
2033	48,73,238	33,38,034	63,724	4866175	1,31,41,172
2034	49,76,551	34,08,800	70,817	4969338	1,34,25,506
2035	50,82,054	34,81,067	78,699	5074688	1,37,16,508
2036	51,89,793	35,54,866	87,458	5182272	1,40,14,388
2037	52,99,817	36,30,229	97,192	5292136	1,43,19,373
2038	54,12,173	37,07,190	1,08,010	5404329	1,46,31,701
2039	55,26,911	37,85,782	1,20,031	5518901	1,49,51,625
2040	56,44,081	38,66,041	1,33,391	5635902	1,52,79,414
2041	57,63,736	39,48,001	1,48,237	5755383	1,56,15,356
2042	58,85,927	40,31,698	1,64,736	5877397	1,59,59,758
2043	60,10,709	41,17,170	1,83,071	6001998	1,63,12,948
2044	61,38,136	42,04,454	2,03,447	6129240	1,66,75,277
2045	62,68,264	42,93,589	2,26,090	6259180	1,70,47,123
2046	64,01,151	43,84,613	2,51,254	6391874	1,74,28,893
2047	65,36,856	44,77,567	2,79,219	6527382	1,78,21,023
2048	66,75,437	45,72,491	3,10,296	6665763	1,82,23,987
2049	68,16,957	46,69,428	3,44,832	6807077	1,86,38,293
2050	69,61,476	47,68,420	3,83,211	6951387	1,90,64,494
2051	71,09,059	48,69,510	4,25,863	7098756	1,95,03,189



10.8.2.18 Yearwise Intercity Bus Trips by Purpose

Yearwise Intercity Bus Trips by Purpose

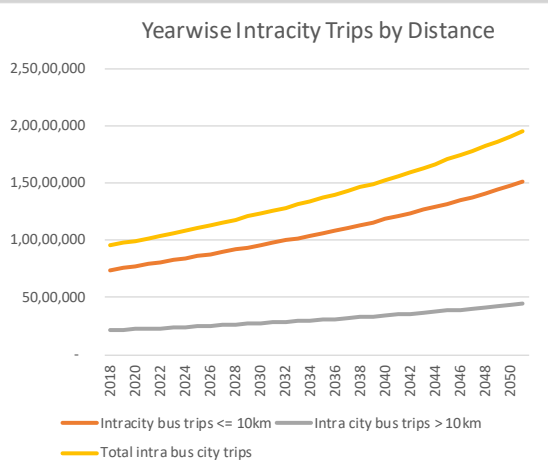
Year	Inter city work trips by bus	Inter city non work trips by bus	Inter city tourist/leisure trips by bus	Inter city education trips by bus	Total inter city trips by bus
2018	30,54,024	24,19,986	13,807	6368257	1,18,56,074
2019	30,86,942	24,45,920	15,343	6431112	1,19,79,318
2020	31,20,215	24,72,133	17,051	6494587	1,21,03,986
2021	31,53,847	24,98,627	18,949	6558689	1,22,30,112
2022	31,87,843	25,25,406	21,058	6623423	1,23,57,730
2023	32,22,206	25,52,473	23,402	6688796	1,24,86,877
2024	32,56,940	25,79,830	26,006	6754815	1,26,17,591
2025	32,92,049	26,07,482	28,901	6821485	1,27,49,916
2026	33,27,537	26,35,430	32,118	6888813	1,28,83,898
2027	33,63,409	26,63,679	35,692	6956805	1,30,19,585
2028	33,99,668	26,92,231	39,665	7025469	1,31,57,033
2029	34,36,319	27,21,090	44,080	7094810	1,32,96,299
2030	34,73,366	27,50,259	48,986	7164836	1,34,37,446
2031	35,10,813	27,79,741	54,438	7235553	1,35,80,545
2032	35,48,664	28,09,541	60,497	7306968	1,37,25,669
2033	35,86,925	28,39,660	67,230	7379088	1,38,72,902
2034	36,25,598	28,70,103	74,713	7451919	1,40,22,333
2035	36,64,690	29,00,873	83,028	7525470	1,41,74,061
2036	37,04,204	29,31,974	92,269	7599746	1,43,28,193
2037	37,44,145	29,63,409	1,02,539	7674756	1,44,84,848
2038	37,84,517	29,95,182	1,13,951	7750505	1,46,44,156
2039	38,25,326	30,27,296	1,26,634	7827003	1,48,06,259
2040	38,66,575	30,59,756	1,40,728	7904255	1,49,71,315
2041	39,08,270	30,92,564	1,56,391	7982270	1,51,39,496
2042	39,50,416	31,25,725	1,73,798	8061055	1,53,10,994
2043	39,93,017	31,59,242	1,93,141	8140618	1,54,86,019
2044	40,36,078	31,93,120	2,14,638	8220966	1,56,64,802
2045	40,79,605	32,27,362	2,38,527	8302107	1,58,47,601
2046	41,23,602	32,61,971	2,65,075	8384049	1,60,34,697
2047	41,68,074	32,96,953	2,94,578	8466799	1,62,26,405
2048	42,13,027	33,32,311	3,27,365	8550367	1,64,23,070
2049	42,58,466	33,68,049	3,63,801	8634759	1,66,25,074
2050	43,04,396	34,04,171	4,04,292	8719984	1,68,32,842
2051	43,50,822	34,40,681	4,49,289	8806050	1,70,46,842



10.8.2.19 Year wise Intracity Trips by Distance

Yearwise Intracity Trips by Distance

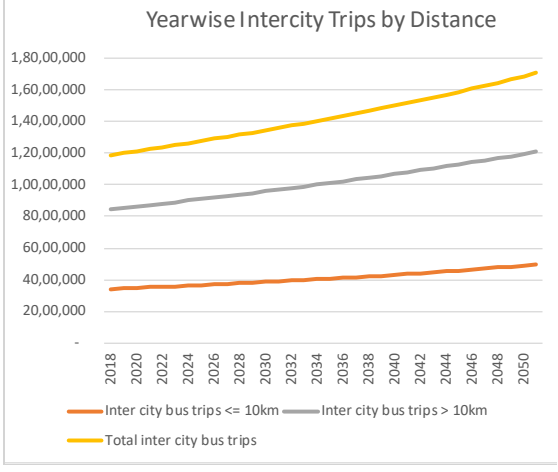
Year	Intracity bus trips <= 10km	Intra city bus trips > 10km	Total intra bus city trips
2018	74,24,800	21,33,492	95,58,292
2019	75,83,533	21,79,694	97,63,227
2020	77,45,304	22,26,603	99,71,907
2021	79,10,452	22,74,451	1,01,84,903
2022	80,79,149	23,23,339	1,04,02,488
2023	82,51,513	23,73,322	1,06,24,835
2024	84,27,646	24,24,441	1,08,52,086
2025	86,07,643	24,76,730	1,10,84,373
2026	87,91,604	25,30,227	1,13,21,831
2027	89,79,629	25,84,968	1,15,64,597
2028	91,71,823	26,40,991	1,18,12,815
2029	93,68,295	26,98,339	1,20,66,634
2030	95,69,158	27,57,053	1,23,26,211
2031	97,74,530	28,17,180	1,25,91,710
2032	99,84,535	28,78,769	1,28,63,303
2033	1,01,99,302	29,41,870	1,31,41,172
2034	1,04,18,966	30,06,540	1,34,25,506
2035	1,06,43,670	30,72,837	1,37,16,508
2036	1,08,73,564	31,40,825	1,40,14,388
2037	1,11,08,803	32,10,570	1,43,19,373
2038	1,13,49,556	32,82,146	1,46,31,701
2039	1,15,95,996	33,55,629	1,49,51,625
2040	1,18,48,309	34,31,105	1,52,79,414
2041	1,21,06,692	35,08,664	1,56,15,356
2042	1,23,71,355	35,88,403	1,59,59,758
2043	1,26,42,518	36,70,429	1,63,12,948
2044	1,29,20,420	37,54,857	1,66,75,277
2045	1,32,05,313	38,41,810	1,70,47,123
2046	1,34,97,468	39,31,425	1,74,28,893
2047	1,37,97,175	40,23,848	1,78,21,023
2048	1,41,04,745	41,19,242	1,82,23,987
2049	1,44,20,512	42,17,781	1,86,38,293
2050	1,47,44,838	43,19,656	1,90,64,494
2051	1,50,78,111	44,25,078	1,95,03,189



10.8.2.20 Year wise Intercity Trips by Distance

Yearwise Intercity Trips by Distance

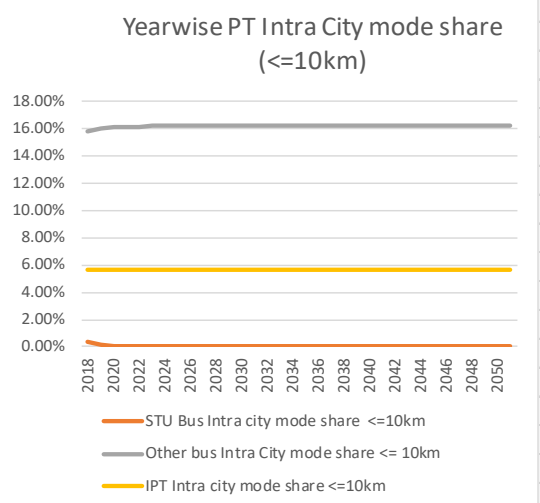
Year	Inter city bus trips <= 10km	Inter city bus trips > 10km	Total inter city bus trips
2018	34,15,407	84,40,667	1,18,56,074
2019	34,49,912	85,29,405	1,19,79,318
2020	34,84,846	86,19,140	1,21,03,986
2021	35,20,224	87,09,889	1,22,30,112
2022	35,56,059	88,01,671	1,23,57,730
2023	35,92,370	88,94,506	1,24,86,877
2024	36,29,174	89,88,417	1,26,17,591
2025	36,66,492	90,83,424	1,27,49,916
2026	37,04,344	91,79,553	1,28,83,898
2027	37,42,756	92,76,829	1,30,19,585
2028	37,81,752	93,75,281	1,31,57,033
2029	38,21,362	94,74,937	1,32,96,299
2030	38,61,617	95,75,829	1,34,37,446
2031	39,02,552	96,77,993	1,35,80,545
2032	39,44,205	97,81,465	1,37,25,669
2033	39,86,618	98,86,285	1,38,72,902
2034	40,29,837	99,92,497	1,40,22,333
2035	40,73,913	1,01,00,148	1,41,74,061
2036	41,18,904	1,02,09,289	1,43,28,193
2037	41,64,870	1,03,19,978	1,44,84,848
2038	42,11,882	1,04,32,273	1,46,44,156
2039	42,60,015	1,05,46,244	1,48,06,259
2040	43,09,353	1,06,61,961	1,49,71,315
2041	43,59,990	1,07,79,506	1,51,39,496
2042	44,12,029	1,08,98,965	1,53,10,994
2043	44,65,583	1,10,20,436	1,54,86,019
2044	45,20,780	1,11,44,022	1,56,64,802
2045	45,77,760	1,12,69,841	1,58,47,601
2046	46,36,677	1,13,98,020	1,60,34,697
2047	46,97,705	1,15,28,700	1,62,26,405
2048	47,61,034	1,16,62,036	1,64,23,070
2049	48,26,876	1,17,98,198	1,66,25,074
2050	48,95,465	1,19,37,376	1,68,32,842
2051	49,67,064	1,20,79,778	1,70,46,842



10.8.2.21 Yearwise PT Intra City mode share (<=10km)

Yearwise PT Intra City mode share (<=10km)

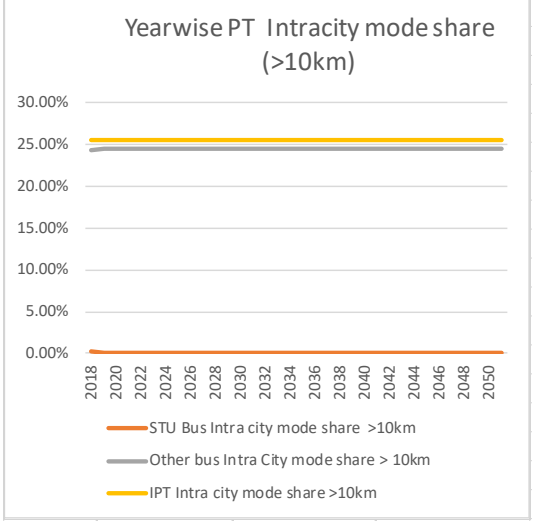
Year	STU Bus Intra city mode share <=10km	Other bus Intra City mode share <= 10km	IPT Intra city mode share <=10km
2018	0.39%	15.80%	5.61%
2019	0.13%	16.06%	5.61%
2020	0.04%	16.15%	5.61%
2021	0.02%	16.17%	5.61%
2022	0.01%	16.18%	5.61%
2023	0.00%	16.19%	5.61%
2024	0.00%	16.19%	5.61%
2025	0.00%	16.19%	5.61%
2026	0.00%	16.19%	5.61%
2027	0.00%	16.19%	5.61%
2028	0.00%	16.19%	5.61%
2029	0.00%	16.19%	5.61%
2030	0.00%	16.19%	5.61%
2031	0.00%	16.19%	5.61%
2032	0.00%	16.19%	5.61%
2033	0.00%	16.19%	5.61%
2034	0.00%	16.19%	5.61%
2035	0.00%	16.19%	5.61%
2036	0.00%	16.19%	5.61%
2037	0.00%	16.19%	5.61%
2038	0.00%	16.19%	5.61%
2039	0.00%	16.19%	5.61%
2040	0.00%	16.19%	5.61%
2041	0.00%	16.19%	5.61%
2042	0.00%	16.19%	5.61%
2043	0.00%	16.19%	5.61%
2044	0.00%	16.19%	5.61%
2045	0.00%	16.19%	5.61%
2046	0.00%	16.19%	5.61%
2047	0.00%	16.19%	5.61%
2048	0.00%	16.19%	5.61%
2049	0.00%	16.19%	5.61%
2050	0.00%	16.19%	5.61%
2051	0.00%	16.19%	5.61%



10.8.2.22 Yearwise PT Intracity mode share (>10km)

Yearwise PT Intracity mode share (>10km)

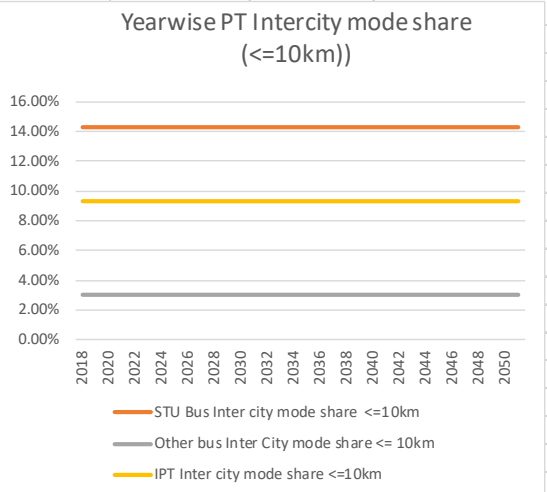
Year	STU Bus Intra city mode share >10km	Other bus Intra City mode share > 10km	IPT Intra city mode share >10km
2018	0.33%	24.26%	25.58%
2019	0.11%	24.48%	25.58%
2020	0.04%	24.55%	25.58%
2021	0.01%	24.58%	25.58%
2022	0.00%	24.59%	25.58%
2023	0.00%	24.59%	25.58%
2024	0.00%	24.59%	25.58%
2025	0.00%	24.59%	25.58%
2026	0.00%	24.59%	25.58%
2027	0.00%	24.59%	25.58%
2028	0.00%	24.59%	25.58%
2029	0.00%	24.59%	25.58%
2030	0.00%	24.59%	25.58%
2031	0.00%	24.59%	25.58%
2032	0.00%	24.59%	25.58%
2033	0.00%	24.59%	25.58%
2034	0.00%	24.59%	25.58%
2035	0.00%	24.59%	25.58%
2036	0.00%	24.59%	25.58%
2037	0.00%	24.59%	25.58%
2038	0.00%	24.59%	25.58%
2039	0.00%	24.59%	25.58%
2040	0.00%	24.59%	25.58%
2041	0.00%	24.59%	25.58%
2042	0.00%	24.59%	25.58%
2043	0.00%	24.59%	25.58%
2044	0.00%	24.59%	25.58%
2045	0.00%	24.59%	25.58%
2046	0.00%	24.59%	25.58%
2047	0.00%	24.59%	25.58%
2048	0.00%	24.59%	25.58%
2049	0.00%	24.59%	25.58%
2050	0.00%	24.59%	25.58%
2051	0.00%	24.59%	25.58%



10.8.2.23 Year wise PT Intercity mode share (<=10km)

Yearwise PT Intercity mode share (<=10km)

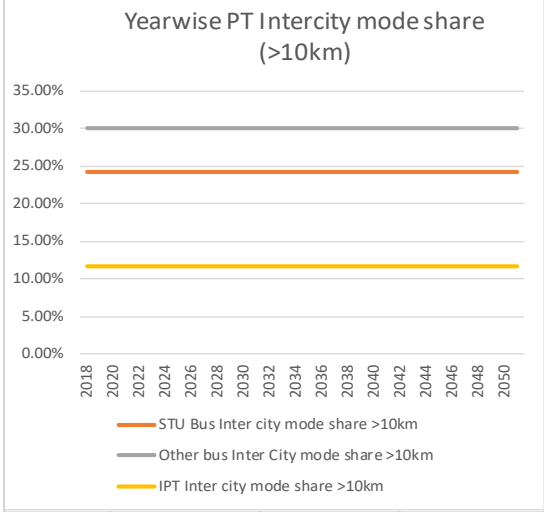
Year	STU Bus Inter city mode share <=10km	Other bus Inter City mode share <= 10km	IPT Inter city mode share <=10km
2018	14.29%	3.02%	9.31%
2019	14.29%	3.02%	9.31%
2020	14.29%	3.02%	9.31%
2021	14.29%	3.02%	9.31%
2022	14.29%	3.02%	9.31%
2023	14.29%	3.02%	9.31%
2024	14.29%	3.02%	9.31%
2025	14.29%	3.02%	9.31%
2026	14.29%	3.02%	9.31%
2027	14.29%	3.02%	9.31%
2028	14.29%	3.02%	9.31%
2029	14.29%	3.02%	9.31%
2030	14.29%	3.02%	9.31%
2031	14.29%	3.02%	9.31%
2032	14.29%	3.02%	9.31%
2033	14.29%	3.02%	9.31%
2034	14.29%	3.02%	9.31%
2035	14.29%	3.02%	9.31%
2036	14.29%	3.02%	9.31%
2037	14.29%	3.02%	9.31%
2038	14.29%	3.02%	9.31%
2039	14.29%	3.02%	9.31%
2040	14.29%	3.02%	9.31%
2041	14.29%	3.02%	9.31%
2042	14.29%	3.02%	9.31%
2043	14.29%	3.02%	9.31%
2044	14.29%	3.02%	9.31%
2045	14.29%	3.02%	9.31%
2046	14.29%	3.02%	9.31%
2047	14.29%	3.02%	9.31%
2048	14.29%	3.02%	9.31%
2049	14.29%	3.02%	9.31%
2050	14.29%	3.02%	9.31%
2051	14.29%	3.02%	9.31%



10.8.2.24 Year wise PT Intercity mode share (>10km)

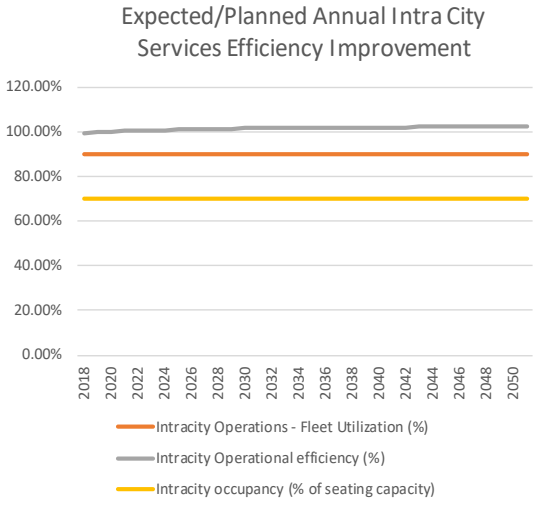
Yearwise PT Intercity mode share (>10km)

Year	STU Bus Inter city mode share >10km	Other bus Inter City mode share >10km	IPT Inter city mode share >10km
2018	24.24%	30.02%	11.71%
2019	24.24%	30.02%	11.71%
2020	24.24%	30.02%	11.71%
2021	24.24%	30.02%	11.71%
2022	24.24%	30.02%	11.71%
2023	24.24%	30.02%	11.71%
2024	24.24%	30.02%	11.71%
2025	24.24%	30.02%	11.71%
2026	24.24%	30.02%	11.71%
2027	24.24%	30.02%	11.71%
2028	24.24%	30.02%	11.71%
2029	24.24%	30.02%	11.71%
2030	24.24%	30.02%	11.71%
2031	24.24%	30.02%	11.71%
2032	24.24%	30.02%	11.71%
2033	24.24%	30.02%	11.71%
2034	24.24%	30.02%	11.71%
2035	24.24%	30.02%	11.71%
2036	24.24%	30.02%	11.71%
2037	24.24%	30.02%	11.71%
2038	24.24%	30.02%	11.71%
2039	24.24%	30.02%	11.71%
2040	24.24%	30.02%	11.71%
2041	24.24%	30.02%	11.71%
2042	24.24%	30.02%	11.71%
2043	24.24%	30.02%	11.71%
2044	24.24%	30.02%	11.71%
2045	24.24%	30.02%	11.71%
2046	24.24%	30.02%	11.71%
2047	24.24%	30.02%	11.71%
2048	24.24%	30.02%	11.71%
2049	24.24%	30.02%	11.71%
2050	24.24%	30.02%	11.71%
2051	24.24%	30.02%	11.71%



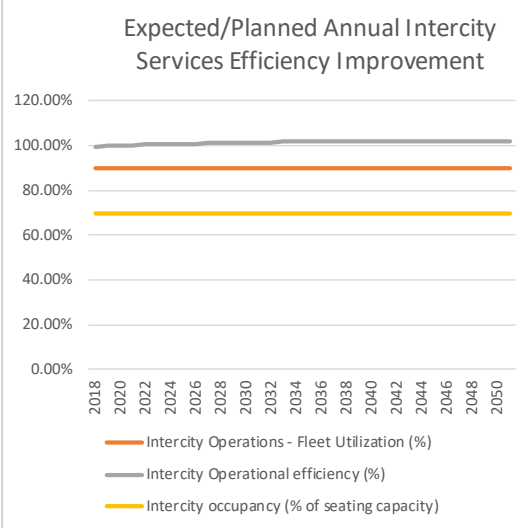
10.8.2.25 Expected/Planned Annual Intra City Services Efficiency Improvement

Expected/Planned Annual Intra City Services Efficiency Improvem			
Year	Intracity Operations - Fleet Utilization (%)	Intracity Operational efficiency (%)	Intracity occupancy (% of seating capacity)
2018	89.97%	99.49%	70.00%
2019	89.97%	99.74%	70.00%
2020	89.97%	99.97%	70.00%
2021	89.97%	100.18%	70.00%
2022	89.97%	100.37%	70.00%
2023	89.97%	100.54%	70.00%
2024	89.97%	100.70%	70.00%
2025	89.97%	100.85%	70.00%
2026	89.97%	100.98%	70.00%
2027	89.97%	101.10%	70.00%
2028	89.97%	101.20%	70.00%
2029	89.97%	101.30%	70.00%
2030	89.97%	101.39%	70.00%
2031	89.97%	101.47%	70.00%
2032	89.97%	101.55%	70.00%
2033	89.97%	101.62%	70.00%
2034	89.97%	101.68%	70.00%
2035	89.97%	101.73%	70.00%
2036	89.97%	101.78%	70.00%
2037	89.97%	101.83%	70.00%
2038	89.97%	101.87%	70.00%
2039	89.97%	101.91%	70.00%
2040	89.97%	101.95%	70.00%
2041	89.97%	101.98%	70.00%
2042	89.97%	102.01%	70.00%
2043	89.97%	102.03%	70.00%
2044	89.97%	102.06%	70.00%
2045	89.97%	102.08%	70.00%
2046	89.97%	102.10%	70.00%
2047	89.97%	102.12%	70.00%
2048	89.97%	102.13%	70.00%
2049	89.97%	102.15%	70.00%
2050	89.97%	102.16%	70.00%
2051	89.97%	102.17%	70.00%



10.8.2.26 Expected/Planned Annual Intercity Services Efficiency Improvement

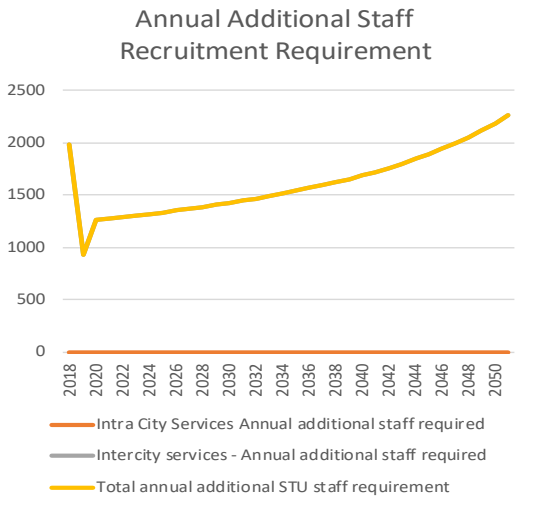
Expected/Planned Annual Intercity Services Efficiency Improvement			
Year	Intercity Operations - Fleet Utilization (%)	Intercity Operational efficiency (%)	Intercity occupancy (% of seating capacity)
2018	89.97%	99.49%	70.00%
2019	89.97%	99.74%	70.00%
2020	89.97%	99.97%	70.00%
2021	89.97%	100.18%	70.00%
2022	89.97%	100.37%	70.00%
2023	89.97%	100.54%	70.00%
2024	89.97%	100.70%	70.00%
2025	89.97%	100.85%	70.00%
2026	89.97%	100.98%	70.00%
2027	89.97%	101.10%	70.00%
2028	89.97%	101.20%	70.00%
2029	89.97%	101.30%	70.00%
2030	89.97%	101.39%	70.00%
2031	89.97%	101.47%	70.00%
2032	89.97%	101.55%	70.00%
2033	89.97%	101.62%	70.00%
2034	89.97%	101.68%	70.00%
2035	89.97%	101.73%	70.00%
2036	89.97%	101.78%	70.00%
2037	89.97%	101.83%	70.00%
2038	89.97%	101.87%	70.00%
2039	89.97%	101.91%	70.00%
2040	89.97%	101.95%	70.00%
2041	89.97%	101.98%	70.00%
2042	89.97%	102.01%	70.00%
2043	89.97%	102.03%	70.00%
2044	89.97%	102.06%	70.00%
2045	89.97%	102.08%	70.00%
2046	89.97%	102.10%	70.00%
2047	89.97%	102.12%	70.00%
2048	89.97%	102.13%	70.00%
2049	89.97%	102.15%	70.00%
2050	89.97%	102.16%	70.00%
2051	89.97%	102.17%	70.00%



10.8.2.27 Annual Additional Staff Recruitment Requirement

Annual Additional Staff Recruitment Requirement

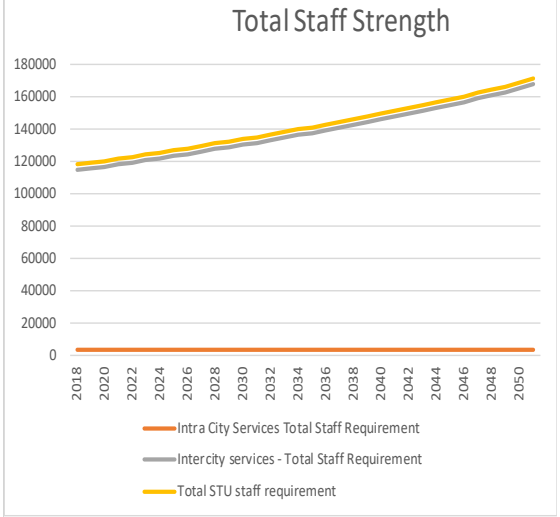
Year	Intra City Services Annual additional staff required	Intercity services - Annual additional staff required	Total annual additional STU staff requirement
2018	0	1983	1983
2019	0	933	933
2020	0	1266	1266
2021	0	1279	1279
2022	0	1293	1293
2023	0	1308	1308
2024	0	1323	1323
2025	0	1338	1338
2026	0	1355	1355
2027	0	1372	1372
2028	0	1390	1390
2029	0	1408	1408
2030	0	1428	1428
2031	0	1448	1448
2032	0	1470	1470
2033	0	1492	1492
2034	0	1515	1515
2035	0	1541	1541
2036	0	1567	1567
2037	0	1595	1595
2038	0	1624	1624
2039	0	1655	1655
2040	0	1689	1689
2041	0	1724	1724
2042	0	1762	1762
2043	0	1802	1802
2044	0	1846	1846
2045	0	1892	1892
2046	0	1942	1942
2047	0	1997	1997
2048	0	2055	2055
2049	0	2118	2118
2050	0	2188	2188
2051	0	2261	2261



10.8.2.28 Total Staff Strength

Total Staff Strength

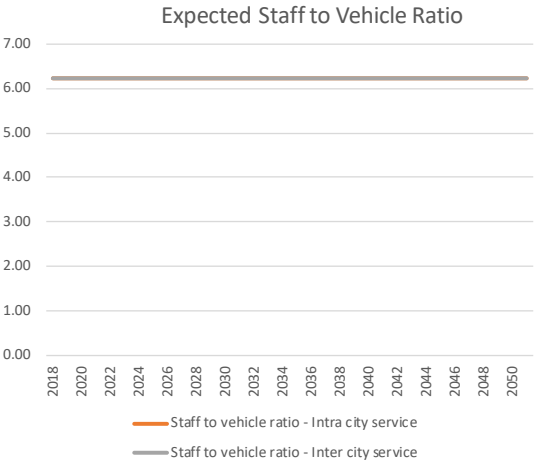
Year	Intra City Services Total Staff Requirement	Intercity services - Total Staff Requirement	Total STU staff requirement
2018	3507	114765	118272
2019	3507	115698	119205
2020	3507	116964	120471
2021	3507	118243	121750
2022	3507	119536	123043
2023	3507	120844	124351
2024	3507	122167	125674
2025	3507	123505	127012
2026	3507	124860	128367
2027	3507	126232	129739
2028	3507	127622	131129
2029	3507	129030	132537
2030	3507	130458	133965
2031	3507	131906	135413
2032	3507	133376	136883
2033	3507	134868	138375
2034	3507	136383	139890
2035	3507	137924	141431
2036	3507	139491	142998
2037	3507	141086	144593
2038	3507	142710	146217
2039	3507	144365	147872
2040	3507	146054	149561
2041	3507	147778	151285
2042	3507	149540	153047
2043	3507	151342	154849
2044	3507	153188	156695
2045	3507	155080	158587
2046	3507	157022	160529
2047	3507	159019	162526
2048	3507	161074	164581
2049	3507	163192	166699
2050	3507	165380	168887
2051	3507	167641	171148



10.8.2.29 Expected Staff to Vehicle Ratio

Expected Staff to Vehicle Ratio

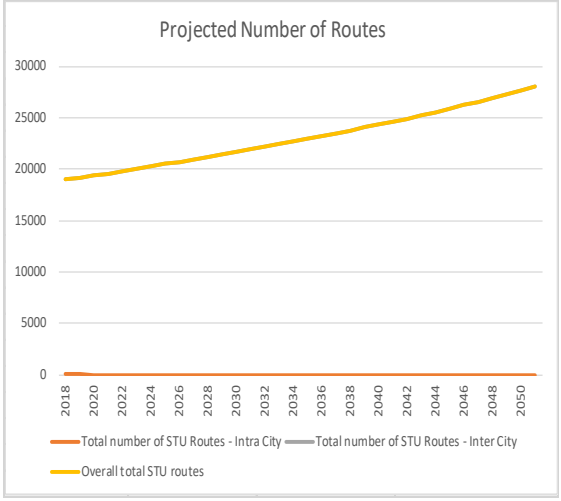
Year	Staff to vehicle ratio - Intra city service	Staff to vehicle ratio - Inter city service
2018	6.24	6.24
2019	6.24	6.24
2020	6.24	6.24
2021	6.24	6.24
2022	6.24	6.24
2023	6.24	6.24
2024	6.24	6.24
2025	6.24	6.24
2026	6.24	6.24
2027	6.24	6.24
2028	6.24	6.24
2029	6.24	6.24
2030	6.24	6.24
2031	6.24	6.24
2032	6.24	6.24
2033	6.24	6.24
2034	6.24	6.24
2035	6.24	6.24
2036	6.24	6.24
2037	6.24	6.24
2038	6.24	6.24
2039	6.24	6.24
2040	6.24	6.24
2041	6.24	6.24
2042	6.24	6.24
2043	6.24	6.24
2044	6.24	6.24
2045	6.24	6.24
2046	6.24	6.24
2047	6.24	6.24
2048	6.24	6.24
2049	6.24	6.24
2050	6.24	6.24
2051	6.24	6.24



10.8.2.30 Projected Number of Routes

Projected Number of Routes

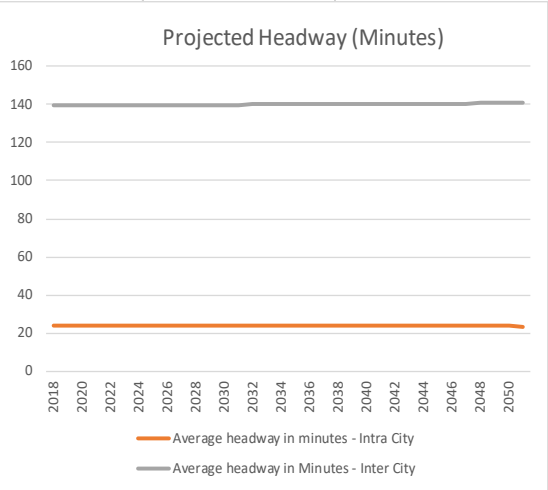
Year	Total number of STU Routes - Intra City	Total number of STU Routes - Inter City	Overall total STU routes
2018	87	19006	19093
2019	30	19166	19196
2020	10	19382	19392
2021	4	19600	19603
2022	1	19820	19821
2023	0	20043	20043
2024	0	20268	20268
2025	0	20497	20497
2026	0	20728	20728
2027	0	20962	20962
2028	0	21199	21199
2029	0	21439	21439
2030	0	21683	21683
2031	0	21930	21930
2032	0	22181	22181
2033	0	22436	22436
2034	0	22695	22695
2035	0	22958	22958
2036	0	23226	23226
2037	0	23499	23499
2038	0	23776	23776
2039	0	24059	24059
2040	0	24348	24348
2041	0	24643	24643
2042	0	24944	24944
2043	0	25252	25252
2044	0	25568	25568
2045	0	25891	25891
2046	0	26224	26224
2047	0	26565	26565
2048	0	26916	26916
2049	0	27279	27279
2050	0	27653	27653
2051	0	28039	28039



10.8.2.31 Projected Headway (Minutes)

Projected Headway (Minutes)

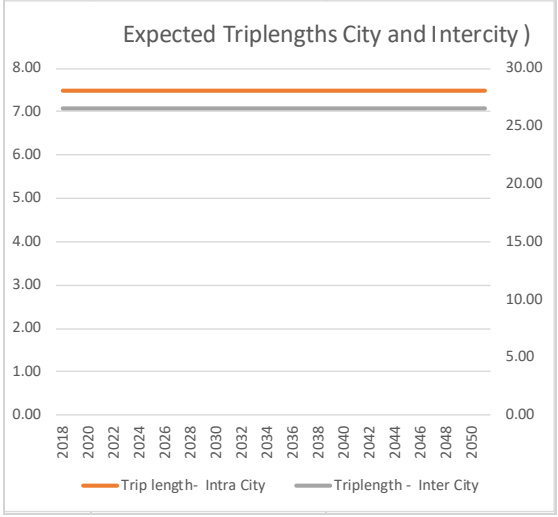
Year	Average headway in minutes - Intra City	Average headway in Minutes - Inter City
2018	24	139
2019	24	139
2020	24	139
2021	24	140
2022	24	140
2023	24	140
2024	24	140
2025	24	140
2026	24	140
2027	24	140
2028	24	140
2029	24	140
2030	24	140
2031	24	140
2032	24	140
2033	24	140
2034	24	140
2035	24	140
2036	24	140
2037	24	140
2038	24	140
2039	24	140
2040	24	140
2041	24	140
2042	24	140
2043	24	140
2044	24	140
2045	24	141
2046	24	141
2047	24	141
2048	24	141
2049	24	141
2050	24	141
2051	24	141



10.8.2.32 Expected Trip Lengths City and Intercity

Expected Triplengths City and Intercity

Year	Trip length- Intra City	Triplength - Inter City
2018	7.48	26.57
2019	7.48	26.57
2020	7.48	26.57
2021	7.48	26.57
2022	7.48	26.57
2023	7.48	26.57
2024	7.48	26.57
2025	7.48	26.57
2026	7.48	26.57
2027	7.48	26.57
2028	7.48	26.57
2029	7.48	26.57
2030	7.48	26.57
2031	7.48	26.57
2032	7.48	26.57
2033	7.48	26.57
2034	7.48	26.57
2035	7.48	26.57
2036	7.48	26.57
2037	7.48	26.57
2038	7.48	26.57
2039	7.48	26.57
2040	7.48	26.57
2041	7.48	26.57
2042	7.48	26.57
2043	7.48	26.57
2044	7.48	26.57
2045	7.48	26.57
2046	7.48	26.57
2047	7.48	26.57
2048	7.48	26.57
2049	7.48	26.57
2050	7.48	26.57
2051	7.48	26.57

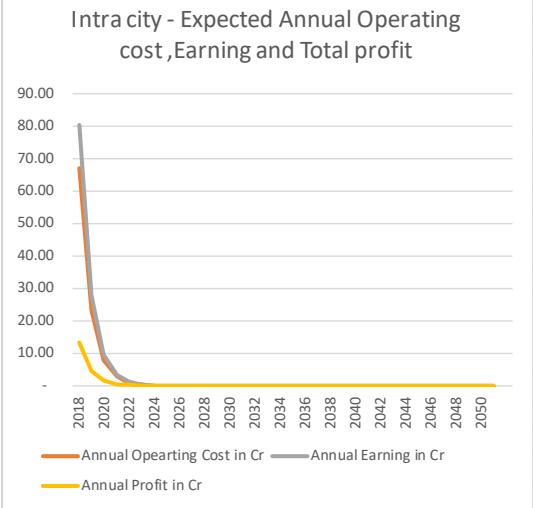


10.8.2.33 Expected Operating cost Intra City and Intercity

Expected Operating cost City and Intercity		
Year	Opearting cost - Intra City	Operating cost - Inter City
2018	1834183	212759936
2019	635302	214488409
2020	220662	216835725
2021	76643	219207598
2022	26620	221605115
2023	9246	224029392
2024	3211	226481575
2025	1115	228962859
2026	387	231474493
2027	135	234017790
2028	47	236594143
2029	16	239205034
2030	6	241852050
2031	2	244536892
2032	1	247261398
2033	0	250027554
2034	0	252837515
2035	0	255693628
2036	0	258598449
2037	0	261554774
2038	0	264565663
2039	0	267634471
2040	0	270764884
2041	0	273960953
2042	0	277227139
2043	0	280568356
2044	0	283990026
2045	0	287498130
2046	0	291099279
2047	0	294800774
2048	0	298610693
2049	0	302537971
2050	0	306592501
2051	0	310785232

10.8.2.34 Intra city - Expected Annual Operating cost, Earning and Total profit

tra city - Expected Annual Operating cost ,Earning and Total prof			
Year	Annual Opearting Cost in Cr	Annual Earning in Cr	Annual Profit in Cr
2018	66.95	80.32	13.37
2019	23.19	27.89	4.70
2020	8.05	9.69	1.63
2021	2.80	3.36	0.57
2022	0.97	1.17	0.20
2023	0.34	0.41	0.07
2024	0.12	0.14	0.02
2025	0.04	0.05	0.01
2026	0.01	0.02	0.00
2027	0.00	0.01	0.00
2028	0.00	0.00	0.00
2029	0.00	0.00	0.00
2030	0.00	0.00	0.00
2031	0.00	0.00	0.00
2032	0.00	0.00	0.00
2033	0.00	0.00	0.00
2034	0.00	0.00	0.00
2035	0.00	0.00	0.00
2036	0.00	0.00	0.00
2037	0.00	0.00	0.00
2038	0.00	0.00	0.00
2039	0.00	0.00	0.00
2040	0.00	0.00	0.00
2041	0.00	0.00	0.00
2042	0.00	0.00	0.00
2043	0.00	0.00	0.00
2044	0.00	0.00	0.00
2045	0.00	0.00	0.00
2046	0.00	0.00	0.00
2047	0.00	0.00	0.00
2048	0.00	0.00	0.00
2049	0.00	0.00	0.00
2050	0.00	0.00	0.00
2051	0.00	0.00	0.00



10.8.2.35 Inter city - Expected Annual Operating cost ,Earning and Total profit

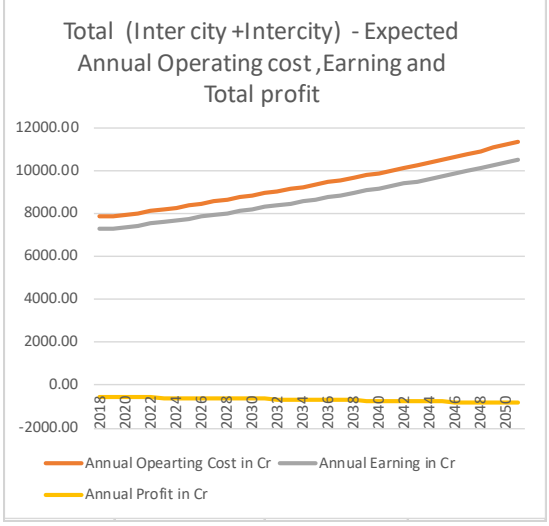
er city - Expected Annual Operating cost ,Earning and Total pro

Year	Annual Opearting Cost in Cr	Annual Earning in Cr	Annual Profit in Cr
2018	7,765.74	7,197.84	-567.89
2019	7,828.83	7,274.80	-554.03
2020	7,914.50	7,352.69	-561.82
2021	8,001.08	7,431.54	-569.54
2022	8,088.59	7,511.37	-577.22
2023	8,177.07	7,592.22	-584.86
2024	8,266.58	7,674.10	-592.47
2025	8,357.14	7,757.07	-600.08
2026	8,448.82	7,841.14	-607.68
2027	8,541.65	7,926.35	-615.30
2028	8,635.69	8,012.76	-622.93
2029	8,730.98	8,100.39	-630.59
2030	8,827.60	8,189.30	-638.30
2031	8,925.60	8,279.55	-646.05
2032	9,025.04	8,371.18	-653.86
2033	9,126.01	8,464.27	-661.73
2034	9,228.57	8,558.88	-669.69
2035	9,332.82	8,655.09	-677.73
2036	9,438.84	8,752.98	-685.86
2037	9,546.75	8,852.65	-694.10
2038	9,656.65	8,954.18	-702.46
2039	9,768.66	9,057.71	-710.95
2040	9,882.92	9,163.34	-719.58
2041	9,999.57	9,271.22	-728.36
2042	10,118.79	9,381.48	-737.31
2043	10,240.75	9,494.31	-746.44
2044	10,365.64	9,609.87	-755.76
2045	10,493.68	9,728.38	-765.31
2046	10,625.12	9,850.04	-775.08
2047	10,760.23	9,975.12	-785.11
2048	10,899.29	10,103.87	-795.42
2049	11,042.64	10,236.61	-806.03
2050	11,190.63	10,373.66	-816.97
2051	11,343.66	10,515.39	-828.27

10.8.2.36 Total (Inter city +Intercity) - Expected Annual Operating cost ,Earning and Total profit

r city +Intercity) - Expected Annual Operating cost ,Earning and T

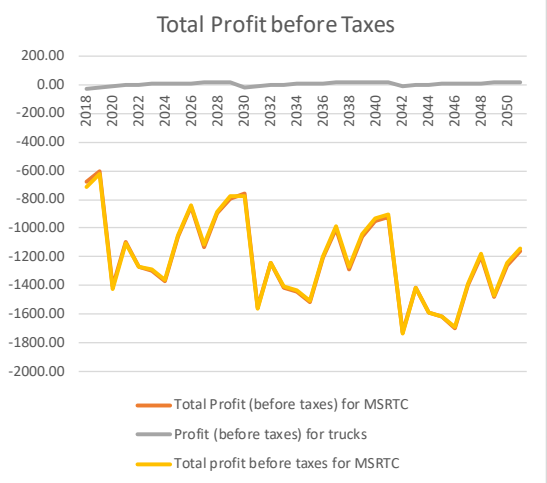
Year	Annual Opearting Cost in Cr	Annual Earning in Cr	Annual Profit in Cr
2018	7832.69	7278.17	-554.52
2019	7852.02	7302.69	-549.33
2020	7922.56	7362.37	-560.19
2021	8003.87	7434.90	-568.98
2022	8089.56	7512.54	-577.02
2023	8177.41	7592.62	-584.79
2024	8266.69	7674.25	-592.45
2025	8357.19	7757.12	-600.07
2026	8448.83	7841.15	-607.68
2027	8541.65	7926.36	-615.29
2028	8635.69	8012.76	-622.93
2029	8730.98	8100.39	-630.59
2030	8827.60	8189.30	-638.30
2031	8925.60	8279.55	-646.05
2032	9025.04	8371.18	-653.86
2033	9126.01	8464.27	-661.73
2034	9228.57	8558.88	-669.69
2035	9332.82	8655.09	-677.73
2036	9438.84	8752.98	-685.86
2037	9546.75	8852.65	-694.10
2038	9656.65	8954.18	-702.46
2039	9768.66	9057.71	-710.95
2040	9882.92	9163.34	-719.58
2041	9999.57	9271.22	-728.36
2042	10118.79	9381.48	-737.31
2043	10240.75	9494.31	-746.44
2044	10365.64	9609.87	-755.76
2045	10493.68	9728.38	-765.31
2046	10625.12	9850.04	-775.08
2047	10760.23	9975.12	-785.11
2048	10899.29	10103.87	-795.42
2049	11042.64	10236.61	-806.03
2050	11190.63	10373.66	-816.97
2051	11343.66	10515.39	-828.27



10.8.2.37 Profit before taxes after Infrastructure development and Fleet Upgradation cost

Profit before taxes after Infrastrucuture development and Fleet Upgradation cost

Year	Total Profit (before taxes) for MSRTC	Profit (before taxes) for trucks	Total profit before taxes for MSRTC
2018	-676.27	-32.25	-708.52
2019	-606.56	-19.54	-626.10
2020	-1410.47	-11.78	-1422.25
2021	-1096.31	-5.49	-1101.80
2022	-1265.29	-0.43	-1265.72
2023	-1292.98	3.63	-1289.35
2024	-1369.16	6.91	-1362.25
2025	-1057.35	9.63	-1047.72
2026	-848.52	11.82	-836.70
2027	-1130.71	13.52	-1117.19
2028	-897.92	14.93	-882.99
2029	-792.79	16.06	-776.73
2030	-761.55	-16.11	-777.66
2031	-1555.86	-6.39	-1562.25
2032	-1241.73	-0.95	-1242.68
2033	-1411.60	3.31	-1408.28
2034	-1440.59	6.90	-1433.69
2035	-1518.33	9.62	-1508.71
2036	-1208.28	11.68	-1196.60
2037	-1001.41	13.57	-987.84
2038	-1285.75	15.11	-1270.64
2039	-1055.32	16.14	-1039.18
2040	-952.77	17.17	-935.60
2041	-924.33	17.85	-906.47
2042	-1721.68	-14.68	-1736.36
2043	-1410.86	-5.25	-1416.11
2044	-1584.32	-0.04	-1584.36
2045	-1617.21	4.20	-1613.02
2046	-1699.20	7.61	-1691.59
2047	-1393.75	10.20	-1383.55
2048	-1191.90	12.15	-1179.75
2049	-1481.69	13.94	-1467.75
2050	-1257.20	15.40	-1241.80
2051	-1161.12	16.37	-1,144.75

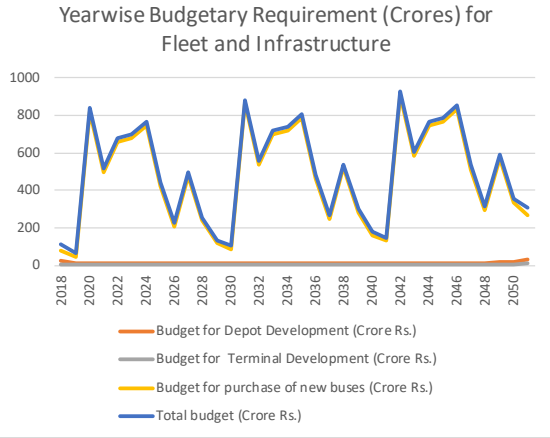


10.8.3 Desirable scenario

10.8.3.1 Year wise Budgetary Requirement (Crores) for Fleet and Infrastructure

Yearwise Budgetary Requirement (Crores) for Fleet and Infrastructure

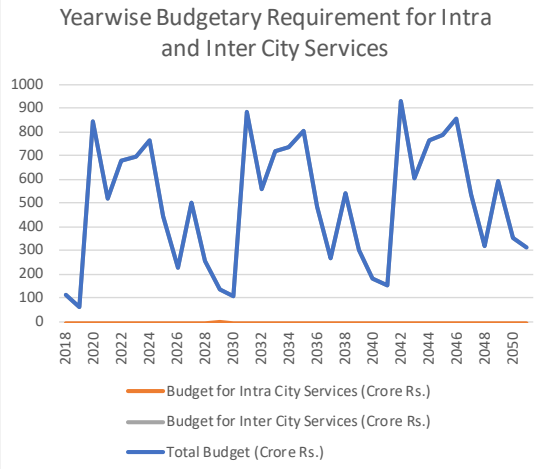
Year	Budget for Depot Development (Crore Rs.)	Budget for Terminal Development (Crore Rs.)	Budget for purchase of new buses (Crore Rs.)	Total budget (Crore Rs.)
2018	23	7	81	112
2019	13	4	46	63
2020	15	5	824	843
2021	15	5	500	519
2022	15	5	659	678
2023	14	5	678	697
2024	14	4	745	764
2025	14	4	425	444
2026	14	4	207	226
2027	14	4	480	499
2028	14	4	239	257
2029	14	4	118	137
2030	14	4	88	106
2031	14	4	865	883
2032	14	4	541	559
2033	14	4	701	719
2034	14	4	720	738
2035	14	4	787	805
2036	14	4	466	485
2037	14	4	249	267
2038	14	4	522	541
2039	14	4	281	300
2040	14	4	161	180
2041	14	5	131	150
2042	15	5	909	928
2043	15	5	585	605
2044	15	5	746	765
2045	15	5	765	785
2046	15	5	834	854
2047	16	5	514	535
2048	16	5	298	319
2049	16	5	573	594
2050	17	5	333	355
2051	33	10	269	312



10.8.3.2 Year Wise Budgetary Requirement for Intra and Inter City Services

Year Wise Budgetary Requirement for Intra and Inter City Services

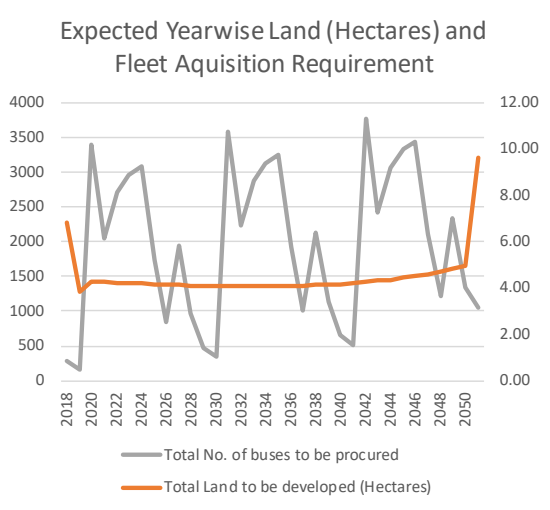
Year	Budget for Intra City Services (Crore Rs.)	Budget for Inter City Services (Crore Rs.)	Total Budget (Crore Rs.)
2018	0	112	112
2019	0	63	63
2020	0	843	843
2021	0	519	519
2022	0	678	678
2023	0	697	697
2024	0	764	764
2025	0	444	444
2026	0	226	226
2027	0	499	499
2028	0	257	257
2029	0	137	137
2030	0	106	106
2031	0	883	883
2032	0	559	559
2033	0	719	719
2034	0	738	738
2035	0	805	805
2036	0	485	485
2037	0	267	267
2038	0	541	541
2039	0	300	300
2040	0	180	180
2041	0	150	150
2042	0	928	928
2043	0	605	605
2044	0	765	765
2045	0	785	785
2046	0	854	854
2047	0	535	535
2048	0	319	319
2049	0	594	594
2050	0	355	355
2051	0	312	312



10.8.3.3 Expected Year wise Land (Hectares) and Fleet Acquisition Requirement

Expected Yearwise Land (Hectares) and Fleet Aquisition Requirement

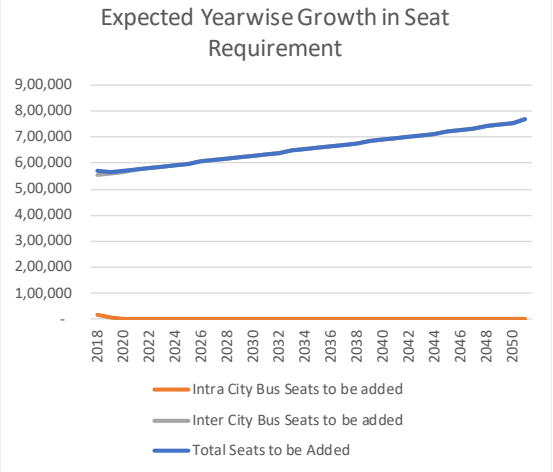
Year	Total Land to be developed (Hectares)	Total No. of buses to be procured
2018	6.82	292
2019	3.86	165
2020	4.30	3403
2021	4.27	2053
2022	4.24	2713
2023	4.22	2961
2024	4.19	3078
2025	4.17	1742
2026	4.15	835
2027	4.13	1951
2028	4.12	958
2029	4.10	468
2030	4.09	340
2031	4.08	3578
2032	4.08	2228
2033	4.08	2887
2034	4.08	3135
2035	4.08	3252
2036	4.09	1917
2037	4.11	1011
2038	4.12	2128
2039	4.15	1136
2040	4.18	647
2041	4.21	521
2042	4.26	3760
2043	4.31	2412
2044	4.37	3074
2045	4.43	3325
2046	4.51	3446
2047	4.60	2114
2048	4.70	1212
2049	4.81	2334
2050	4.94	1348
2051	9.62	1059



10.8.3.4 Expected Year wise Growth in Seat Requirement

Expected Yearwise Growth in Seat Requirement

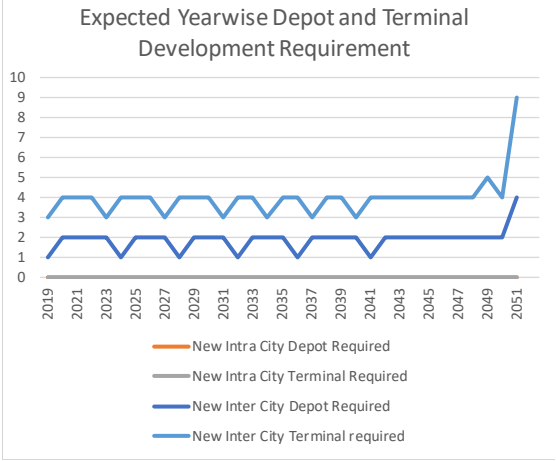
Year	Intra City Bus Seats to be added	Inter City Bus Seats to be added	Total Seats to be Added
2018	16,032	5,55,807	5,71,839
2019	5,552	5,61,586	5,67,138
2020	1,925	5,67,932	5,69,857
2021	667	5,74,237	5,74,904
2022	231	5,80,501	5,80,732
2023	80	5,86,727	5,86,807
2024	28	5,92,917	5,92,945
2025	10	5,99,073	5,99,083
2026	3	6,05,198	6,05,201
2027	1	6,11,294	6,11,296
2028	0	6,17,365	6,17,366
2029	0	6,23,413	6,23,413
2030	0	6,29,441	6,29,441
2031	0	6,35,454	6,35,454
2032	0	6,41,454	6,41,454
2033	0	6,47,446	6,47,446
2034	0	6,53,435	6,53,435
2035	0	6,59,426	6,59,426
2036	0	6,65,423	6,65,423
2037	0	6,71,433	6,71,433
2038	0	6,77,462	6,77,462
2039	0	6,83,517	6,83,517
2040	0	6,89,607	6,89,607
2041	0	6,95,739	6,95,739
2042	0	7,01,922	7,01,922
2043	0	7,08,168	7,08,168
2044	0	7,14,487	7,14,487
2045	0	7,20,891	7,20,891
2046	0	7,27,395	7,27,395
2047	0	7,34,013	7,34,013
2048	0	7,40,762	7,40,762
2049	0	7,47,659	7,47,659
2050	0	7,54,725	7,54,725
2051	0	7,68,036	7,68,036



10.8.3.5 Expected Year-wise Depot and Terminal Development Requirement

Expected Yearwise Depot and Terminal Development Requirement

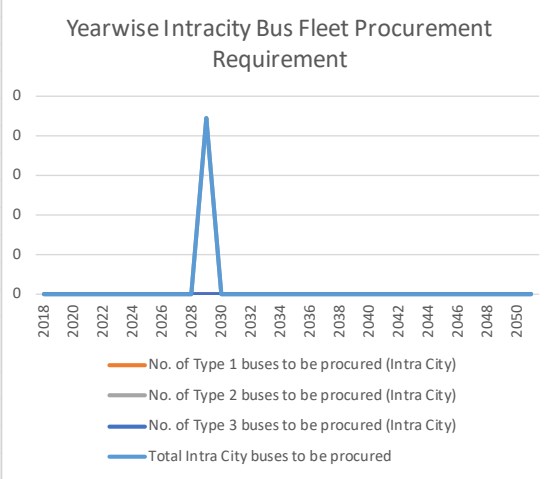
Year	New Intra City Depot Required	New Intra City Terminal Required	New Inter City Depot Required	New Inter City Terminal required
2018	0	0	3	6
2019	0	0	1	3
2020	0	0	2	4
2021	0	0	2	4
2022	0	0	2	4
2023	0	0	2	3
2024	0	0	1	4
2025	0	0	2	4
2026	0	0	2	4
2027	0	0	2	3
2028	0	0	1	4
2029	0	0	2	4
2030	0	0	2	4
2031	0	0	2	3
2032	0	0	1	4
2033	0	0	2	4
2034	0	0	2	3
2035	0	0	2	4
2036	0	0	1	4
2037	0	0	2	3
2038	0	0	2	4
2039	0	0	2	4
2040	0	0	2	3
2041	0	0	1	4
2042	0	0	2	4
2043	0	0	2	4
2044	0	0	2	4
2045	0	0	2	4
2046	0	0	2	4
2047	0	0	2	4
2048	0	0	2	4
2049	0	0	2	5
2050	0	0	2	4
2051	0	0	4	9



10.8.3.6 Year-wise Intracity Bus Fleet Procurement Requirement

Yearwise Intracity Bus Fleet Procurement Requirement

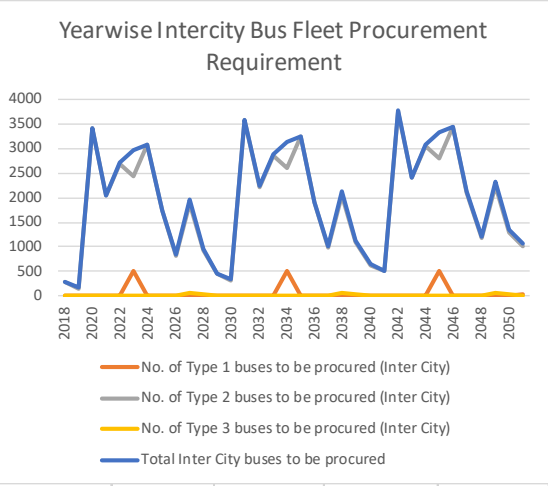
Year	No. of Type 1 buses to be procured (Intra City)	No. of Type 2 buses to be procured (Intra City)	No. of Type 3 buses to be procured (Intra City)	Total Intra City buses to be procured
2018	0	0	0	0
2019	0	0	0	0
2020	0	0	0	0
2021	0	0	0	0
2022	0	0	0	0
2023	0	0	0	0
2024	0	0	0	0
2025	0	0	0	0
2026	0	0	0	0
2027	0	0	0	0
2028	0	0	0	0
2029	0	0	0	0
2030	0	0	0	0
2031	0	0	0	0
2032	0	0	0	0
2033	0	0	0	0
2034	0	0	0	0
2035	0	0	0	0
2036	0	0	0	0
2037	0	0	0	0
2038	0	0	0	0
2039	0	0	0	0
2040	0	0	0	0
2041	0	0	0	0
2042	0	0	0	0
2043	0	0	0	0
2044	0	0	0	0
2045	0	0	0	0
2046	0	0	0	0
2047	0	0	0	0
2048	0	0	0	0
2049	0	0	0	0
2050	0	0	0	0
2051	0	0	0	0



10.8.3.7 Yearwise Intercity Bus Fleet Procurement Requirement

Yearwise Intercity Bus Fleet Procurement Requirement

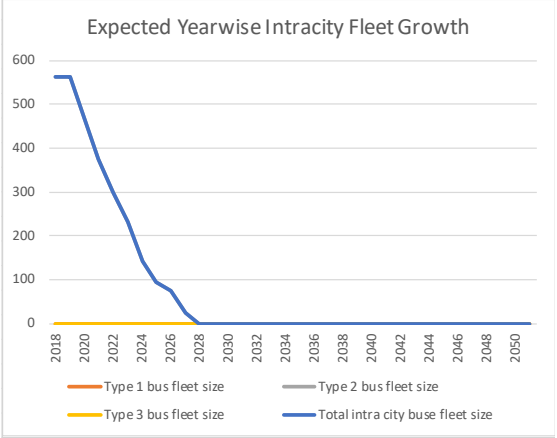
Year	No. of Type 1 buses to be procured (Inter City)	No. of Type 2 buses to be procured (Inter City)	No. of Type 3 buses to be procured (Inter City)	Total Inter City buses to be procured
2018	8	282	2	292
2019	5	159	1	165
2020	5	3397	1	3403
2021	5	2046	1	2053
2022	5	2688	19	2713
2023	512	2431	17	2961
2024	5	3071	1	3078
2025	5	1735	1	1742
2026	5	828	1	835
2027	5	1877	69	1951
2028	5	927	26	958
2029	13	451	3	468
2030	10	328	2	340
2031	10	3565	3	3578
2032	10	2215	3	2228
2033	10	2857	21	2887
2034	517	2600	18	3135
2035	10	3240	2	3252
2036	10	1904	2	1917
2037	10	998	2	1011
2038	10	2047	70	2128
2039	10	1099	27	1136
2040	18	624	5	647
2041	15	503	4	521
2042	15	3741	4	3760
2043	15	2393	4	2412
2044	15	3037	22	3074
2045	522	2783	20	3325
2046	15	3426	4	3446
2047	15	2095	4	2114
2048	16	1192	4	1212
2049	16	2246	72	2334
2050	16	1303	29	1348
2051	30	1021	7	1059



10.8.3.8 Expected Yearwise Intracity Fleet Growth

Expected Yearwise Intracity Fleet Growth

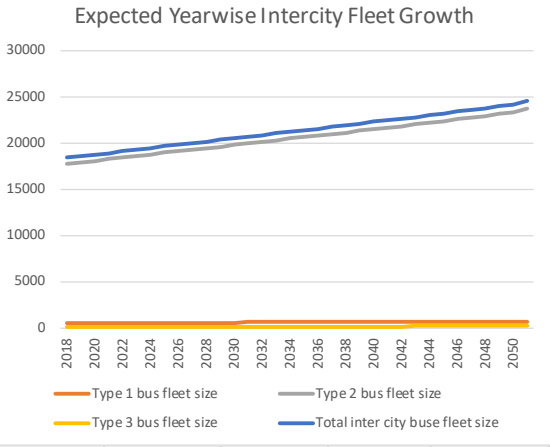
Year	Type 1 bus fleet size	Type 2 bus fleet size	Type 3 bus fleet size	Total intra city buse fleet size
2018	0	562	0	562
2019	0	562	0	562
2020	0	464	0	464
2021	0	376	0	376
2022	0	300	0	300
2023	0	231	0	231
2024	0	143	0	143
2025	0	95	0	95
2026	0	75	0	75
2027	0	23	0	23
2028	0	0	0	0
2029	0	0	0	0
2030	0	0	0	0
2031	0	0	0	0
2032	0	0	0	0
2033	0	0	0	0
2034	0	0	0	0
2035	0	0	0	0
2036	0	0	0	0
2037	0	0	0	0
2038	0	0	0	0
2039	0	0	0	0
2040	0	0	0	0
2041	0	0	0	0
2042	0	0	0	0
2043	0	0	0	0
2044	0	0	0	0
2045	0	0	0	0
2046	0	0	0	0
2047	0	0	0	0
2048	0	0	0	0
2049	0	0	0	0
2050	0	0	0	0
2051	0	0	0	0



10.8.3.9 Expected Yearwise Intercity Fleet Growth

Expected Yearwise Intercity Fleet Growth

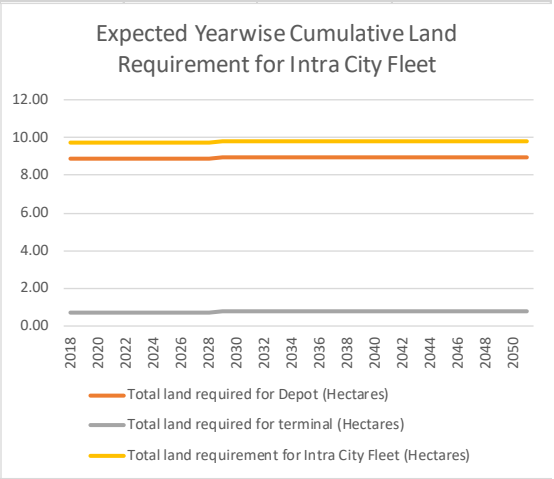
Year	Type 1 bus fleet size	Type 2 bus fleet size	Type 3 bus fleet size	Total inter city buse fleet size
2018	515	17722	129	18366
2019	520	17881	130	18531
2020	525	18059	132	18715
2021	530	18235	133	18898
2022	535	18410	134	19080
2023	540	18585	135	19260
2024	545	18758	137	19440
2025	550	18930	138	19618
2026	555	19102	139	19796
2027	560	19272	140	19973
2028	565	19443	142	20149
2029	570	19612	143	20325
2030	575	19781	144	20500
2031	580	19950	145	20675
2032	585	20118	147	20850
2033	590	20287	148	21024
2034	595	20455	149	21199
2035	600	20624	150	21374
2036	605	20793	151	21549
2037	609	20963	153	21725
2038	614	21133	154	21902
2039	619	21305	155	22079
2040	624	21478	156	22258
2041	629	21652	158	22439
2042	635	21828	159	22621
2043	640	22006	160	22806
2044	645	22186	162	22992
2045	650	22369	163	23182
2046	656	22555	164	23375
2047	661	22746	166	23572
2048	667	22940	167	23774
2049	673	23139	169	23980
2050	679	23343	170	24192
2051	690	23741	173	24604



10.8.3.10 Expected Yearwise Cumulative Land Requirement for Intra City Fleet

Expected Yearwise Cumulative Land Requirement for Intra City Fleet

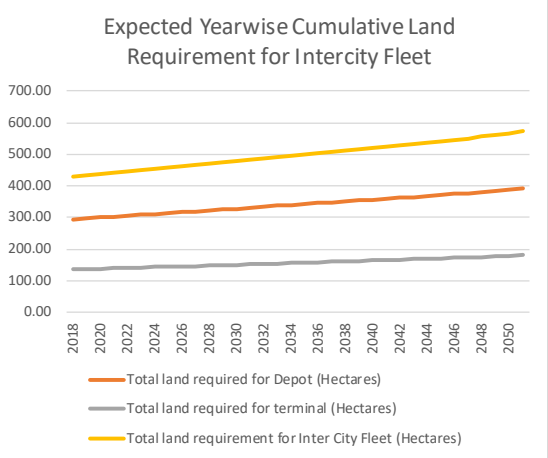
Year	Total land required for Depot (Hectares)	Total land required for terminal (Hectares)	Total land requirement for Intra City Fleet (Hectares)
2018	8.99	0.79	9.78
2019	8.99	0.79	9.78
2020	8.99	0.79	9.78
2021	8.99	0.79	9.78
2022	8.99	0.79	9.78
2023	8.99	0.79	9.78
2024	8.99	0.79	9.78
2025	8.99	0.79	9.78
2026	8.99	0.79	9.78
2027	8.99	0.79	9.78
2028	8.99	0.79	9.78
2029	8.99	0.79	9.78
2030	8.99	0.79	9.78
2031	8.99	0.79	9.78
2032	8.99	0.79	9.78
2033	8.99	0.79	9.78
2034	8.99	0.79	9.78
2035	8.99	0.79	9.78
2036	8.99	0.79	9.78
2037	8.99	0.79	9.78
2038	8.99	0.79	9.78
2039	8.99	0.79	9.78
2040	8.99	0.79	9.78
2041	8.99	0.79	9.78
2042	8.99	0.79	9.78
2043	8.99	0.79	9.78
2044	8.99	0.79	9.78
2045	8.99	0.79	9.78
2046	8.99	0.79	9.78
2047	8.99	0.79	9.78
2048	8.99	0.79	9.78
2049	8.99	0.79	9.78
2050	8.99	0.79	9.78
2051	8.99	0.79	9.78



10.8.3.11 Expected Yearwise Cumulative Land Requirement for Intercity Fleet

Expected Yearwise Cumulative Land Requirement for Intercity Fleet

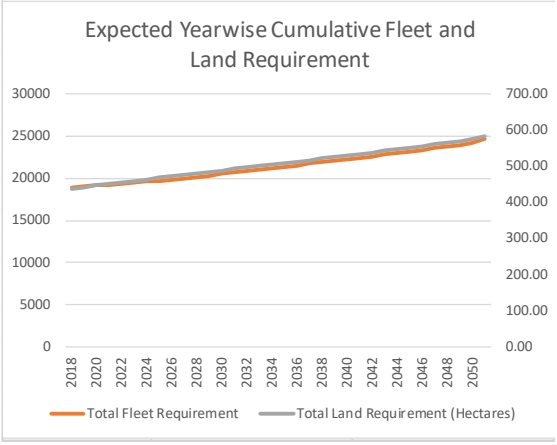
Year	Total land required for Depot (Hectares)	Total land required for terminal (Hectares)	Total land requirement for Inter City Fleet (Hectares)
2018	293.86	134.99	428.85
2019	296.50	136.20	432.70
2020	299.44	137.56	437.00
2021	302.37	138.90	441.27
2022	305.28	140.24	445.51
2023	308.16	141.56	449.73
2024	311.04	142.88	453.92
2025	313.89	144.20	458.09
2026	316.74	145.50	462.24
2027	319.57	146.80	466.37
2028	322.39	148.10	470.49
2029	325.20	149.39	474.59
2030	328.01	150.68	478.68
2031	330.80	151.96	482.77
2032	333.60	153.25	486.85
2033	336.39	154.53	490.92
2034	339.19	155.81	495.00
2035	341.98	157.10	499.08
2036	344.79	158.39	503.18
2037	347.60	159.68	507.28
2038	350.43	160.98	511.41
2039	353.27	162.28	515.56
2040	356.13	163.60	519.73
2041	359.02	164.93	523.95
2042	361.94	166.27	528.20
2043	364.89	167.62	532.51
2044	367.88	168.99	536.87
2045	370.92	170.39	541.31
2046	374.01	171.81	545.82
2047	377.16	173.26	550.42
2048	380.38	174.74	555.12
2049	383.68	176.25	559.93
2050	387.07	177.81	564.88
2051	393.66	180.84	574.49



10.8.3.12 Expected Yearwise Cumulative Fleet and Land Requirement

Expected Yearwise Cumulative Fleet and Land Requirement

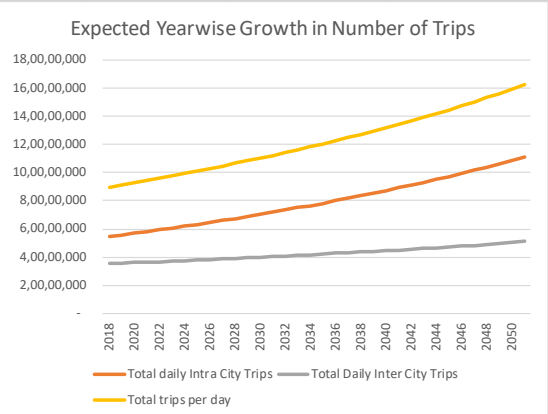
Year	Total Fleet Requirement	Total Land Requirement (Hectares)
2018	18928	438.62
2019	19093	442.48
2020	19179	446.78
2021	19274	451.05
2022	19380	455.29
2023	19491	459.51
2024	19583	463.70
2025	19713	467.87
2026	19871	472.02
2027	19996	476.15
2028	20149	480.27
2029	20325	484.37
2030	20500	488.46
2031	20675	492.55
2032	20850	496.62
2033	21025	500.70
2034	21199	504.78
2035	21374	508.86
2036	21549	512.96
2037	21725	517.06
2038	21902	521.19
2039	22079	525.33
2040	22258	529.51
2041	22439	533.73
2042	22621	537.98
2043	22806	542.29
2044	22992	546.65
2045	23182	551.09
2046	23375	555.60
2047	23572	560.20
2048	23774	564.90
2049	23980	569.71
2050	24192	574.66
2051	24604	584.27



10.8.3.13 Expected Yearwise Growth in Number of Trips

Expected Yearwise Growth in Number of Trips

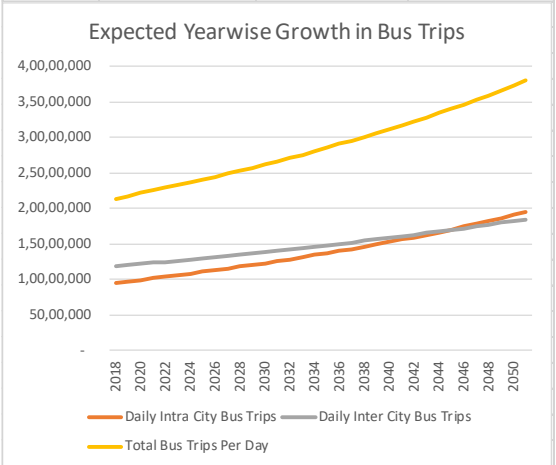
Year	Total daily Intra City Trips	Total Daily Inter City Trips	Total trips per day
2018	5,45,45,370	3,52,89,150	8,98,34,520
2019	5,57,08,018	3,56,52,052	9,13,60,070
2020	5,68,96,013	3,60,19,270	9,29,15,283
2021	5,81,09,971	3,63,90,917	9,45,00,888
2022	5,93,50,528	3,67,67,118	9,61,17,646
2023	6,06,18,346	3,71,48,005	9,77,66,351
2024	6,19,14,109	3,75,33,723	9,94,47,832
2025	6,32,38,527	3,79,24,429	10,11,62,956
2026	6,45,92,341	3,83,20,292	10,29,12,633
2027	6,59,76,320	3,87,21,499	10,46,97,819
2028	6,73,91,266	3,91,28,252	10,65,19,518
2029	6,88,38,018	3,95,40,769	10,83,78,787
2030	7,03,17,451	3,99,59,294	11,02,76,745
2031	7,18,30,481	4,03,84,088	11,22,14,569
2032	7,33,78,070	4,08,15,442	11,41,93,512
2033	7,49,61,226	4,12,53,671	11,62,14,897
2034	7,65,81,010	4,16,99,125	11,82,80,135
2035	7,82,38,539	4,21,52,185	12,03,90,724
2036	7,99,34,994	4,26,13,272	12,25,48,266
2037	8,16,71,621	4,30,82,850	12,47,54,471
2038	8,34,49,739	4,35,61,428	12,70,11,167
2039	8,52,70,749	4,40,49,570	12,93,20,319
2040	8,71,36,138	4,45,47,896	13,16,84,034
2041	8,90,47,490	4,50,57,093	13,41,04,583
2042	9,10,06,493	4,55,77,916	13,65,84,409
2043	9,30,14,951	4,61,11,205	13,91,26,156
2044	9,50,74,794	4,66,57,883	14,17,32,677
2045	9,71,88,092	4,72,18,975	14,44,07,067
2046	9,93,57,068	4,77,95,614	14,71,52,682
2047	10,15,84,111	4,83,89,054	14,99,73,165
2048	10,38,71,799	4,90,00,684	15,28,72,483
2049	10,62,22,912	4,96,32,043	15,58,54,955
2050	10,86,40,455	5,02,84,837	15,89,25,292
2051	11,11,27,684	5,09,60,955	16,20,88,639



10.8.3.14 Expected Yearwise Growth in Bus Trips

Expected Yearwise Growth in Bus Trips

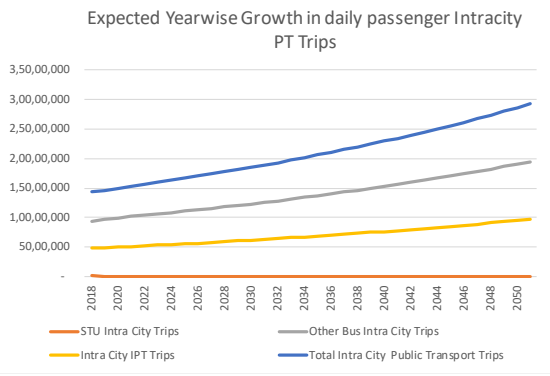
Year	Daily Intra City Bus Trips	Daily Inter City Bus Trips	Total Bus Trips Per Day
2018	95,58,292	1,18,56,074	2,14,14,367
2019	97,63,227	1,20,14,528	2,17,77,755
2020	99,71,907	1,21,74,841	2,21,46,748
2021	1,01,84,903	1,23,37,053	2,25,21,956
2022	1,04,02,488	1,25,01,204	2,29,03,692
2023	1,06,24,835	1,26,67,338	2,32,92,173
2024	1,08,52,086	1,28,35,502	2,36,87,588
2025	1,10,84,373	1,30,05,748	2,40,90,121
2026	1,13,21,831	1,31,78,129	2,44,99,960
2027	1,15,64,597	1,33,52,704	2,49,17,301
2028	1,18,12,815	1,35,29,538	2,53,42,353
2029	1,20,66,634	1,37,08,699	2,57,75,333
2030	1,23,26,211	1,38,90,262	2,62,16,473
2031	1,25,91,710	1,40,74,309	2,66,66,019
2032	1,28,63,303	1,42,60,928	2,71,24,232
2033	1,31,41,172	1,44,50,217	2,75,91,389
2034	1,34,25,506	1,46,42,281	2,80,67,787
2035	1,37,16,508	1,48,37,236	2,85,53,743
2036	1,40,14,388	1,50,35,209	2,90,49,597
2037	1,43,19,373	1,52,36,340	2,95,55,713
2038	1,46,31,701	1,54,40,781	3,00,72,483
2039	1,49,51,625	1,56,48,703	3,06,00,328
2040	1,52,79,414	1,58,60,288	3,11,39,703
2041	1,56,15,356	1,60,75,744	3,16,91,100
2042	1,59,59,758	1,62,95,293	3,22,55,051
2043	1,63,12,948	1,65,19,187	3,28,32,134
2044	1,66,75,277	1,67,47,698	3,34,22,975
2045	1,70,47,123	1,69,81,133	3,40,28,256
2046	1,74,28,893	1,72,19,825	3,46,48,718
2047	1,78,21,023	1,74,64,148	3,52,85,172
2048	1,82,23,987	1,77,14,514	3,59,38,500
2049	1,86,38,293	1,79,71,378	3,66,09,671
2050	1,90,64,494	1,82,35,246	3,72,99,740
2051	1,95,03,189	1,85,06,681	3,80,09,869



10.8.3.15 Expected Yearwise Growth in daiy Intracity passenger intracity PT Trips

Expected Yearwise Growth in daiy Intracity passenger intracity PT Trips

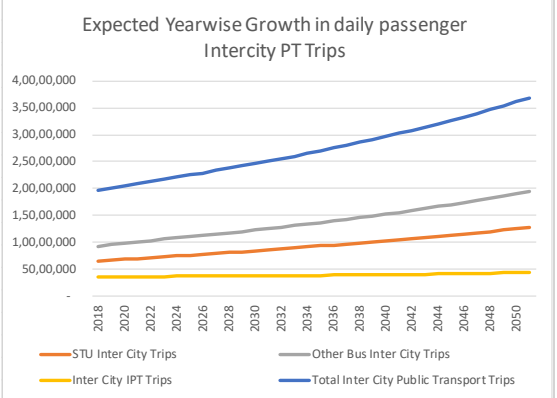
Year	STU Intra City Trips	Other Bus Intra City Trips	Intra City IPT Trips	Total Intra City Public Transport Trips
2018	2,05,857	93,52,435	47,92,296	1,43,50,588
2019	71,484	96,91,742	48,94,390	1,46,57,616
2020	24,823	99,47,080	49,98,704	1,49,70,607
2021	8,620	1,01,76,276	51,05,291	1,52,90,187
2022	2,993	1,03,99,485	52,14,206	1,56,16,684
2023	1,040	1,06,23,782	53,25,506	1,59,50,328
2024	361	1,08,51,708	54,39,250	1,62,91,319
2025	125	1,10,84,226	55,55,499	1,66,39,851
2026	44	1,13,21,761	56,74,317	1,69,96,121
2027	15	1,15,64,550	57,95,770	1,73,60,335
2028	5	1,18,12,771	59,19,926	1,77,32,703
2029	2	1,20,66,587	60,46,858	1,81,13,447
2030	1	1,23,26,158	61,76,640	1,85,02,798
2031	0	1,25,91,649	63,09,349	1,89,00,999
2032	0	1,28,63,233	64,45,069	1,93,08,302
2033	0	1,31,41,091	65,83,884	1,97,24,976
2034	0	1,34,25,414	67,25,885	2,01,51,299
2035	0	1,37,16,402	68,71,166	2,05,87,568
2036	0	1,40,14,268	70,19,827	2,10,34,094
2037	0	1,43,19,236	71,71,972	2,14,91,208
2038	0	1,46,31,545	73,27,712	2,19,59,258
2039	0	1,49,51,449	74,87,166	2,24,38,615
2040	0	1,52,79,215	76,50,457	2,29,29,672
2041	0	1,56,15,132	78,17,717	2,34,32,849
2042	0	1,59,59,505	79,89,088	2,39,48,593
2043	0	1,63,12,663	81,64,719	2,44,77,382
2044	0	1,66,74,957	83,44,771	2,50,19,728
2045	0	1,70,46,764	85,29,414	2,55,76,178
2046	0	1,74,28,490	87,18,832	2,61,47,323
2047	0	1,78,20,572	89,13,223	2,67,33,795
2048	0	1,82,23,482	91,12,798	2,73,36,279
2049	0	1,86,37,728	93,17,785	2,79,55,513
2050	0	1,90,63,862	95,28,431	2,85,92,293
2051	0	1,95,02,482	97,45,002	2,92,47,484



10.8.3.16 Expected Yearwise Growth in daily Intercity passenger intercity PT Trips

Expected Yearwise Growth in daily Intercity passenger intercity PT Trips

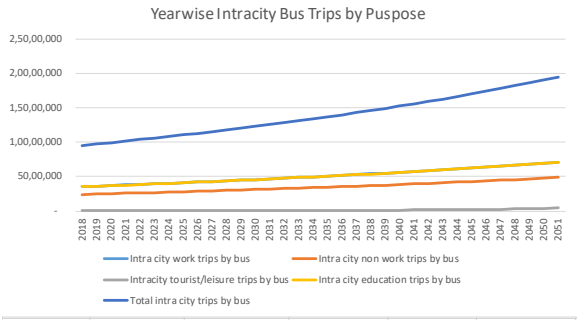
Year	STU Inter City Trips	Other Bus Inter City Trips	Inter City IPT Trips	Total Inter City Public Transport Trips
2018	65,91,623	93,52,435	36,59,886	1,96,03,944
2019	67,38,044	96,91,742	36,72,771	2,01,02,557
2020	68,86,336	99,47,080	36,85,903	2,05,19,320
2021	70,36,536	1,01,76,276	36,99,302	2,09,12,114
2022	71,88,681	1,03,99,485	37,12,990	2,13,01,155
2023	73,42,814	1,06,23,782	37,26,989	2,16,93,585
2024	74,98,977	1,08,51,708	37,41,326	2,20,92,011
2025	76,57,220	1,10,84,226	37,56,030	2,24,97,476
2026	78,17,591	1,13,21,761	37,71,134	2,29,10,486
2027	79,80,146	1,15,64,550	37,86,671	2,33,31,367
2028	81,44,942	1,18,12,771	38,02,682	2,37,60,396
2029	83,12,045	1,20,66,587	38,19,208	2,41,97,840
2030	84,81,521	1,23,26,158	38,36,297	2,46,43,976
2031	86,53,446	1,25,91,649	38,54,001	2,50,99,095
2032	88,27,900	1,28,63,233	38,72,377	2,55,63,510
2033	90,04,972	1,31,41,091	38,91,488	2,60,37,551
2034	91,84,758	1,34,25,414	39,11,405	2,65,21,577
2035	93,67,364	1,37,16,402	39,32,204	2,70,15,969
2036	95,52,903	1,40,14,268	39,53,970	2,75,21,141
2037	97,41,503	1,43,19,236	39,76,798	2,80,37,538
2038	99,33,303	1,46,31,545	40,00,792	2,85,65,640
2039	1,01,28,454	1,49,51,449	40,26,064	2,91,05,967
2040	1,03,27,124	1,52,79,215	40,52,743	2,96,59,082
2041	1,05,29,498	1,56,15,132	40,80,967	3,02,25,597
2042	1,07,35,780	1,59,59,505	41,10,891	3,08,06,176
2043	1,09,46,196	1,63,12,663	41,42,684	3,14,01,542
2044	1,11,60,993	1,66,74,957	41,76,534	3,20,12,484
2045	1,13,80,447	1,70,46,764	42,12,649	3,26,39,860
2046	1,16,04,863	1,74,28,490	42,51,257	3,32,84,611
2047	1,18,34,578	1,78,20,572	42,92,612	3,39,47,763
2048	1,20,69,966	1,82,23,482	43,36,993	3,46,30,441
2049	1,23,11,441	1,86,37,728	43,84,709	3,53,33,877
2050	1,25,59,463	1,90,63,862	44,36,099	3,60,59,423
2051	1,28,14,542	1,95,02,482	44,91,540	3,68,08,565



10.8.3.17 Yearwise Intracity Bus Trips by Puspose

Yearwise Intracity Bus Trips by Puspose

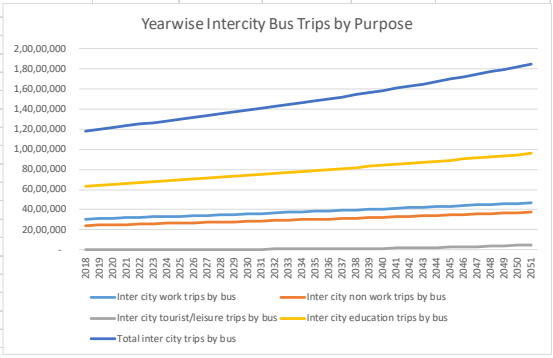
Year	Intra city work trips by bus	Intra city non work trips by bus	Intracity tourist/leisure trips by bus	Intra city education trips by bus	Total intra city trips by bus
2018	35,56,943	24,36,436	13,084	3551829	95,58,292
2019	36,32,784	24,88,367	14,542	3627534	97,63,227
2020	37,09,950	25,41,217	16,162	3704578	99,71,907
2021	37,88,653	25,95,124	17,961	3783164	1,01,84,903
2022	38,68,991	26,50,153	19,960	3863384	1,04,02,488
2023	39,51,020	27,06,340	22,182	3945294	1,06,24,835
2024	40,34,784	27,63,716	24,650	4028936	1,08,52,086
2025	41,20,322	28,22,307	27,394	4114350	1,10,84,373
2026	42,07,673	28,82,140	30,443	4201575	1,13,21,831
2027	42,96,876	29,43,242	33,831	4290648	1,15,64,597
2028	43,87,969	30,05,638	37,597	4381610	1,18,12,815
2029	44,80,994	30,69,358	41,781	4474500	1,20,66,634
2030	45,75,991	31,34,428	46,431	4569360	1,23,26,211
2031	46,73,003	32,00,878	51,599	4666230	1,25,91,710
2032	47,72,070	32,68,737	57,342	4765154	1,28,63,303
2033	48,73,238	33,38,034	63,724	4866175	1,31,41,172
2034	49,76,551	34,08,800	70,817	4969338	1,34,25,506
2035	50,82,054	34,81,067	78,699	5074688	1,37,16,508
2036	51,89,793	35,54,866	87,458	5182272	1,40,14,388
2037	52,99,817	36,30,229	97,192	5292136	1,43,19,373
2038	54,12,173	37,07,190	1,08,010	5404329	1,46,31,701
2039	55,26,911	37,85,782	1,20,031	5518901	1,49,51,625
2040	56,44,081	38,66,041	1,33,391	5635902	1,52,79,414
2041	57,63,736	39,48,001	1,48,237	5755383	1,56,15,356
2042	58,85,927	40,31,698	1,64,736	5877397	1,59,59,758
2043	60,10,709	41,17,170	1,83,071	6001998	1,63,12,948
2044	61,38,136	42,04,454	2,03,447	6129240	1,66,75,277
2045	62,68,264	42,93,589	2,26,090	6259180	1,70,47,123
2046	64,01,151	43,84,613	2,51,254	6391874	1,74,28,893
2047	65,36,856	44,77,567	2,79,219	6527382	1,78,21,023
2048	66,75,437	45,72,491	3,10,296	6665763	1,82,23,987
2049	68,16,957	46,69,428	3,44,832	6807077	1,86,38,293
2050	69,61,476	47,68,420	3,83,211	6951387	1,90,64,494
2051	71,09,059	48,69,510	4,25,863	7098756	1,95,03,189



10.8.3.18 Yearwise Intercity Bus Trips by Purpose

Yearwise Intercity Bus Trips by Purpose

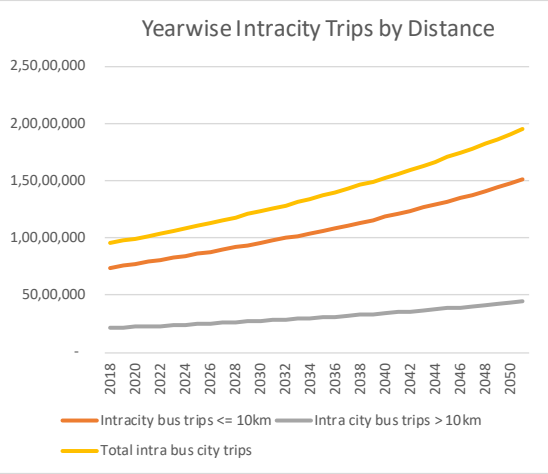
Year	Inter city work trips by bus	Inter city non work trips by bus	Inter city tourist/leisure trips by bus	Inter city education trips by bus	Total inter city trips by bus
2018	30,54,024	24,19,986	13,807	6368257	1,18,56,074
2019	30,95,275	24,52,986	15,404	6450863	1,20,14,528
2020	31,36,988	24,86,354	17,185	6534315	1,21,74,841
2021	31,79,167	25,20,093	19,171	6618622	1,23,37,053
2022	32,21,818	25,54,207	21,386	6703792	1,25,01,204
2023	32,64,946	25,88,701	23,855	6789835	1,26,67,338
2024	33,08,556	26,23,579	26,609	6876759	1,28,35,502
2025	33,52,653	26,58,844	29,679	6964572	1,30,05,748
2026	33,97,243	26,94,501	33,101	7053284	1,31,78,129
2027	34,42,331	27,30,554	36,917	7142903	1,33,52,704
2028	34,87,922	27,67,007	41,171	7233438	1,35,29,538
2029	35,34,022	28,03,865	45,914	7324898	1,37,08,699
2030	35,80,636	28,41,132	51,200	7417294	1,38,90,262
2031	36,27,770	28,78,813	57,093	7510633	1,40,74,309
2032	36,75,430	29,16,912	63,662	7604925	1,42,60,928
2033	37,23,620	29,55,433	70,983	7700180	1,44,50,217
2034	37,72,348	29,94,381	79,144	7796408	1,46,42,281
2035	38,21,619	30,33,760	88,239	7893617	1,48,37,236
2036	38,71,438	30,73,576	98,377	7991818	1,50,35,209
2037	39,21,812	31,13,833	1,09,674	8091021	1,52,36,340
2038	39,72,747	31,54,535	1,22,265	8191234	1,54,40,781
2039	40,24,248	31,95,688	1,36,296	8292470	1,56,48,703
2040	40,76,323	32,37,297	1,51,932	8394737	1,58,60,288
2041	41,28,976	32,79,366	1,69,357	8498045	1,60,75,744
2042	41,82,215	33,21,900	1,88,773	8602406	1,62,95,293
2043	42,36,046	33,64,904	2,10,408	8707830	1,65,19,187
2044	42,90,474	34,08,383	2,34,514	8814326	1,67,47,698
2045	43,45,508	34,52,343	2,61,375	8921907	1,69,81,133
2046	44,01,153	34,96,789	2,91,302	9030581	1,72,19,825
2047	44,57,415	35,41,726	3,24,646	9140362	1,74,64,148
2048	45,14,302	35,87,158	3,61,794	9251258	1,77,14,514
2049	45,71,821	36,33,093	4,03,182	9363282	1,79,71,378
2050	46,29,977	36,79,534	4,49,290	9476445	1,82,35,246
2051	46,88,779	37,26,488	5,00,656	9590758	1,85,06,681



10.8.3.19 Year wise Intracity Trips by Distance

Yearwise Intracity Trips by Distance

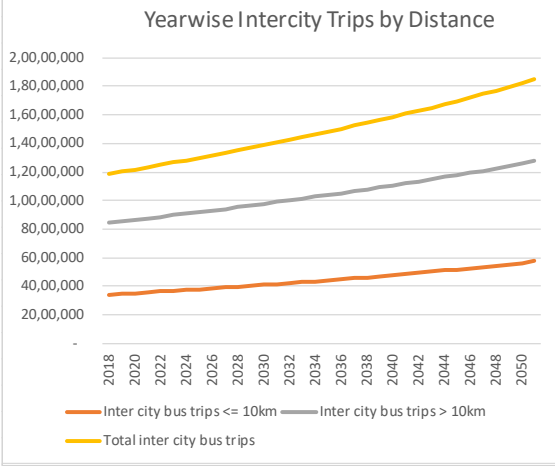
Year	Intracity bus trips <= 10km	Intra city bus trips > 10km	Total intra bus city trips
2018	74,24,800	21,33,492	95,58,292
2019	75,83,533	21,79,694	97,63,227
2020	77,45,304	22,26,603	99,71,907
2021	79,10,452	22,74,451	1,01,84,903
2022	80,79,149	23,23,339	1,04,02,488
2023	82,51,513	23,73,322	1,06,24,835
2024	84,27,646	24,24,441	1,08,52,086
2025	86,07,643	24,76,730	1,10,84,373
2026	87,91,604	25,30,227	1,13,21,831
2027	89,79,629	25,84,968	1,15,64,597
2028	91,71,823	26,40,991	1,18,12,815
2029	93,68,295	26,98,339	1,20,66,634
2030	95,69,158	27,57,053	1,23,26,211
2031	97,74,530	28,17,180	1,25,91,710
2032	99,84,535	28,78,769	1,28,63,303
2033	1,01,99,302	29,41,870	1,31,41,172
2034	1,04,18,966	30,06,540	1,34,25,506
2035	1,06,43,670	30,72,837	1,37,16,508
2036	1,08,73,564	31,40,825	1,40,14,388
2037	1,11,08,803	32,10,570	1,43,19,373
2038	1,13,49,556	32,82,146	1,46,31,701
2039	1,15,95,996	33,55,629	1,49,51,625
2040	1,18,48,309	34,31,105	1,52,79,414
2041	1,21,06,692	35,08,664	1,56,15,356
2042	1,23,71,355	35,88,403	1,59,59,758
2043	1,26,42,518	36,70,429	1,63,12,948
2044	1,29,20,420	37,54,857	1,66,75,277
2045	1,32,05,313	38,41,810	1,70,47,123
2046	1,34,97,468	39,31,425	1,74,28,893
2047	1,37,97,175	40,23,848	1,78,21,023
2048	1,41,04,745	41,19,242	1,82,23,987
2049	1,44,20,512	42,17,781	1,86,38,293
2050	1,47,44,838	43,19,656	1,90,64,494
2051	1,50,78,111	44,25,078	1,95,03,189



10.8.3.20 Year wise Intercity Trips by Distance

Yearwise Intercity Trips by Distance

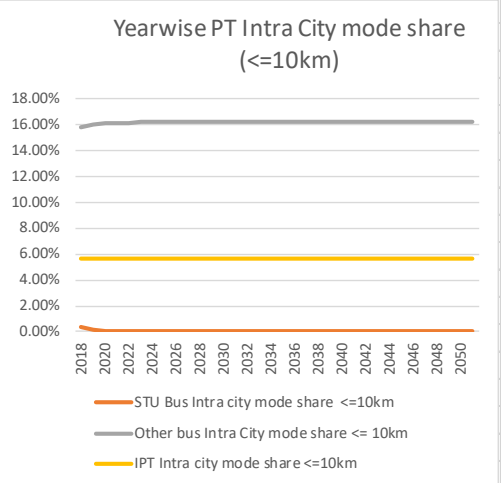
Year	Inter city bus trips <= 10km	Inter city bus trips > 10km	Total inter city bus trips
2018	34,15,407	84,40,667	1,18,56,074
2019	34,68,843	85,45,685	1,20,14,528
2020	35,22,934	86,51,907	1,21,74,841
2021	35,77,699	87,59,354	1,23,37,053
2022	36,33,157	88,68,047	1,25,01,204
2023	36,89,329	89,78,009	1,26,67,338
2024	37,46,237	90,89,265	1,28,35,502
2025	38,03,908	92,01,840	1,30,05,748
2026	38,62,367	93,15,761	1,31,78,129
2027	39,21,646	94,31,059	1,33,52,704
2028	39,81,775	95,47,763	1,35,29,538
2029	40,42,791	96,65,908	1,37,08,699
2030	41,04,734	97,85,528	1,38,90,262
2031	41,67,646	99,06,663	1,40,74,309
2032	42,31,574	1,00,29,354	1,42,60,928
2033	42,96,571	1,01,53,646	1,44,50,217
2034	43,62,694	1,02,79,587	1,46,42,281
2035	44,30,007	1,04,07,229	1,48,37,236
2036	44,98,579	1,05,36,630	1,50,35,209
2037	45,68,489	1,06,67,851	1,52,36,340
2038	46,39,821	1,08,00,961	1,54,40,781
2039	47,12,671	1,09,36,032	1,56,48,703
2040	47,87,144	1,10,73,145	1,58,60,288
2041	48,63,355	1,12,12,388	1,60,75,744
2042	49,41,435	1,13,53,859	1,62,95,293
2043	50,21,525	1,14,97,661	1,65,19,187
2044	51,03,786	1,16,43,913	1,67,47,698
2045	51,88,392	1,17,92,741	1,69,81,133
2046	52,75,540	1,19,44,285	1,72,19,825
2047	53,65,446	1,20,98,702	1,74,64,148
2048	54,58,352	1,22,56,161	1,77,14,514
2049	55,54,527	1,24,16,851	1,79,71,378
2050	56,54,268	1,25,80,978	1,82,35,246
2051	57,57,907	1,27,48,774	1,85,06,681



10.8.3.21 Yearwise PT Intra City mode share (<=10km)

Yearwise PT Intra City mode share (<=10km)

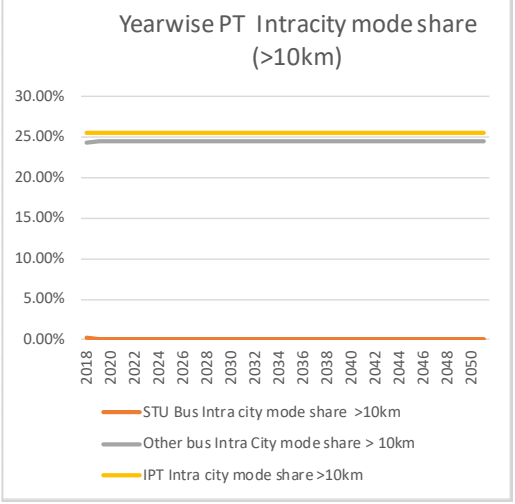
Year	STU Bus Intra city mode share <=10km	Other bus Intra City mode share <= 10km	IPT Intra city mode share <=10km
2018	0.39%	15.80%	5.61%
2019	0.13%	16.06%	5.61%
2020	0.04%	16.15%	5.61%
2021	0.02%	16.17%	5.61%
2022	0.01%	16.18%	5.61%
2023	0.00%	16.19%	5.61%
2024	0.00%	16.19%	5.61%
2025	0.00%	16.19%	5.61%
2026	0.00%	16.19%	5.61%
2027	0.00%	16.19%	5.61%
2028	0.00%	16.19%	5.61%
2029	0.00%	16.19%	5.61%
2030	0.00%	16.19%	5.61%
2031	0.00%	16.19%	5.61%
2032	0.00%	16.19%	5.61%
2033	0.00%	16.19%	5.61%
2034	0.00%	16.19%	5.61%
2035	0.00%	16.19%	5.61%
2036	0.00%	16.19%	5.61%
2037	0.00%	16.19%	5.61%
2038	0.00%	16.19%	5.61%
2039	0.00%	16.19%	5.61%
2040	0.00%	16.19%	5.61%
2041	0.00%	16.19%	5.61%
2042	0.00%	16.19%	5.61%
2043	0.00%	16.19%	5.61%
2044	0.00%	16.19%	5.61%
2045	0.00%	16.19%	5.61%
2046	0.00%	16.19%	5.61%
2047	0.00%	16.19%	5.61%
2048	0.00%	16.19%	5.61%
2049	0.00%	16.19%	5.61%
2050	0.00%	16.19%	5.61%
2051	0.00%	16.19%	5.61%



10.8.3.22 Yearwise PT Intracity mode share (>10km)

Yearwise PT Intracity mode share (>10km)

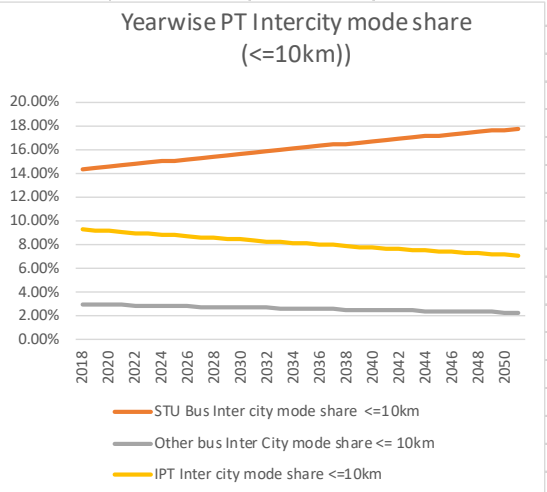
Year	STU Bus Intra city mode share >10km	Other bus Intra City mode share > 10km	IPT Intra city mode share >10km
2018	0.33%	24.26%	25.58%
2019	0.11%	24.48%	25.58%
2020	0.04%	24.55%	25.58%
2021	0.01%	24.58%	25.58%
2022	0.00%	24.59%	25.58%
2023	0.00%	24.59%	25.58%
2024	0.00%	24.59%	25.58%
2025	0.00%	24.59%	25.58%
2026	0.00%	24.59%	25.58%
2027	0.00%	24.59%	25.58%
2028	0.00%	24.59%	25.58%
2029	0.00%	24.59%	25.58%
2030	0.00%	24.59%	25.58%
2031	0.00%	24.59%	25.58%
2032	0.00%	24.59%	25.58%
2033	0.00%	24.59%	25.58%
2034	0.00%	24.59%	25.58%
2035	0.00%	24.59%	25.58%
2036	0.00%	24.59%	25.58%
2037	0.00%	24.59%	25.58%
2038	0.00%	24.59%	25.58%
2039	0.00%	24.59%	25.58%
2040	0.00%	24.59%	25.58%
2041	0.00%	24.59%	25.58%
2042	0.00%	24.59%	25.58%
2043	0.00%	24.59%	25.58%
2044	0.00%	24.59%	25.58%
2045	0.00%	24.59%	25.58%
2046	0.00%	24.59%	25.58%
2047	0.00%	24.59%	25.58%
2048	0.00%	24.59%	25.58%
2049	0.00%	24.59%	25.58%
2050	0.00%	24.59%	25.58%
2051	0.00%	24.59%	25.58%



10.8.3.23 Year wise PT Intercity mode share (<=10km)

Yearwise PT Intercity mode share (<=10km)

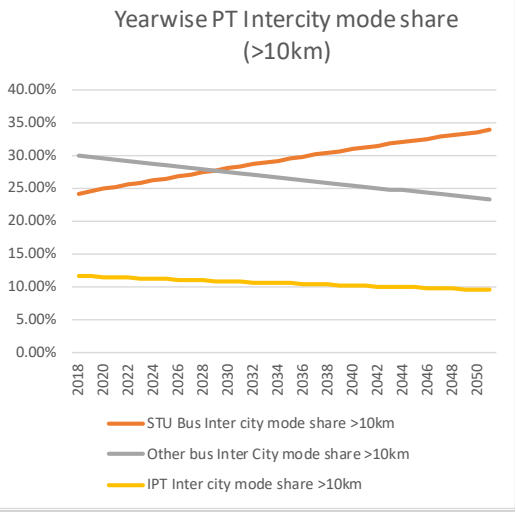
Year	STU Bus Inter city mode share <=10km	Other bus Inter City mode share <= 10km	IPT Inter city mode share <=10km
2018	14.29%	3.02%	9.31%
2019	14.41%	2.99%	9.24%
2020	14.53%	2.97%	9.16%
2021	14.65%	2.94%	9.08%
2022	14.77%	2.92%	9.01%
2023	14.88%	2.89%	8.94%
2024	15.00%	2.87%	8.86%
2025	15.11%	2.85%	8.79%
2026	15.22%	2.82%	8.72%
2027	15.34%	2.80%	8.65%
2028	15.45%	2.78%	8.58%
2029	15.56%	2.75%	8.51%
2030	15.67%	2.73%	8.44%
2031	15.77%	2.71%	8.37%
2032	15.88%	2.69%	8.30%
2033	15.99%	2.66%	8.23%
2034	16.09%	2.64%	8.16%
2035	16.20%	2.62%	8.10%
2036	16.30%	2.60%	8.03%
2037	16.41%	2.58%	7.96%
2038	16.51%	2.56%	7.90%
2039	16.61%	2.54%	7.83%
2040	16.71%	2.52%	7.77%
2041	16.81%	2.50%	7.71%
2042	16.91%	2.47%	7.64%
2043	17.01%	2.45%	7.58%
2044	17.11%	2.43%	7.52%
2045	17.20%	2.41%	7.46%
2046	17.30%	2.39%	7.39%
2047	17.39%	2.37%	7.33%
2048	17.49%	2.36%	7.27%
2049	17.58%	2.34%	7.21%
2050	17.67%	2.32%	7.16%
2051	17.77%	2.30%	7.10%



10.8.3.24 Year wise PT Intercity mode share (>10km)

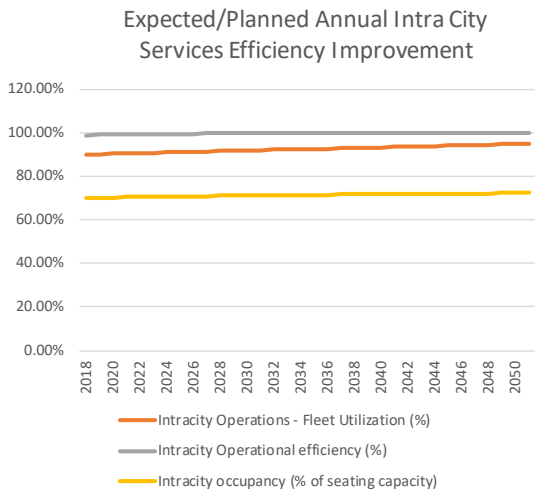
Yearwise PT Intercity mode share (>10km)

Year	STU Bus Inter city mode share >10km	Other bus Inter City mode share >10km	IPT Inter city mode share >10km
2018	24.24%	30.02%	11.71%
2019	24.57%	29.79%	11.64%
2020	24.90%	29.56%	11.57%
2021	25.23%	29.34%	11.49%
2022	25.55%	29.12%	11.42%
2023	25.87%	28.90%	11.35%
2024	26.19%	28.68%	11.28%
2025	26.51%	28.46%	11.21%
2026	26.82%	28.25%	11.14%
2027	27.13%	28.03%	11.07%
2028	27.44%	27.82%	11.00%
2029	27.74%	27.61%	10.93%
2030	28.04%	27.41%	10.87%
2031	28.34%	27.20%	10.80%
2032	28.64%	26.99%	10.73%
2033	28.94%	26.79%	10.67%
2034	29.23%	26.59%	10.60%
2035	29.52%	26.39%	10.54%
2036	29.81%	26.19%	10.47%
2037	30.09%	26.00%	10.41%
2038	30.38%	25.80%	10.35%
2039	30.66%	25.61%	10.28%
2040	30.93%	25.42%	10.22%
2041	31.21%	25.23%	10.16%
2042	31.48%	25.04%	10.10%
2043	31.76%	24.85%	10.04%
2044	32.03%	24.67%	9.98%
2045	32.29%	24.48%	9.92%
2046	32.56%	24.30%	9.86%
2047	32.82%	24.12%	9.80%
2048	33.08%	23.94%	9.74%
2049	33.34%	23.76%	9.69%
2050	33.60%	23.59%	9.63%
2051	33.85%	23.41%	9.57%



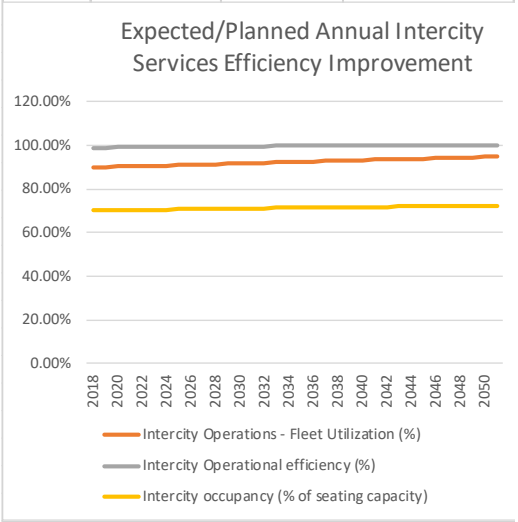
10.8.3.25 Expected/Planned Annual Intra City Services Efficiency Improvement

Expected/Planned Annual Intra City Services Efficiency Improvem			
Year	Intracity Operations - Fleet Utilization (%)	Intracity Operational efficiency (%)	Intracity occupancy (% of seating capacity)
2018	89.97%	98.90%	70.10%
2019	90.12%	99.00%	70.20%
2020	90.27%	99.09%	70.29%
2021	90.42%	99.17%	70.39%
2022	90.57%	99.25%	70.48%
2023	90.72%	99.31%	70.56%
2024	90.87%	99.38%	70.65%
2025	91.02%	99.43%	70.73%
2026	91.17%	99.48%	70.82%
2027	91.32%	99.53%	70.89%
2028	91.47%	99.57%	70.97%
2029	91.62%	99.61%	71.05%
2030	91.77%	99.65%	71.12%
2031	91.92%	99.68%	71.19%
2032	92.07%	99.71%	71.26%
2033	92.22%	99.73%	71.33%
2034	92.37%	99.76%	71.40%
2035	92.52%	99.78%	71.46%
2036	92.67%	99.80%	71.53%
2037	92.82%	99.82%	71.59%
2038	92.97%	99.83%	71.65%
2039	93.12%	99.85%	71.71%
2040	93.27%	99.86%	71.77%
2041	93.42%	99.87%	71.82%
2042	93.57%	99.89%	71.88%
2043	93.72%	99.90%	71.93%
2044	93.87%	99.91%	71.98%
2045	94.02%	99.91%	72.03%
2046	94.17%	99.92%	72.08%
2047	94.32%	99.93%	72.13%
2048	94.47%	99.94%	72.18%
2049	94.62%	99.94%	72.22%
2050	94.77%	99.95%	72.27%
2051	94.92%	99.95%	72.31%



10.8.3.26 Expected/Planned Annual Intercity Services Efficiency Improvement

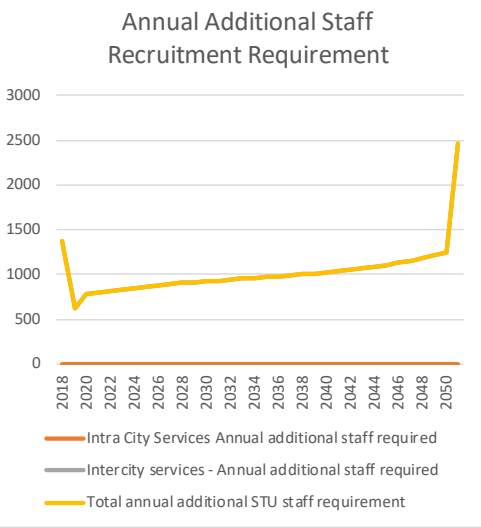
Expected/Planned Annual Intercity Services Efficiency Improvement			
Year	Intercity Operations - Fleet Utilization (%)	Intercity Operational efficiency (%)	Intercity occupancy (% of seating capacity)
2018	89.97%	98.90%	70.10%
2019	90.12%	99.00%	70.20%
2020	90.27%	99.09%	70.29%
2021	90.42%	99.17%	70.39%
2022	90.57%	99.25%	70.48%
2023	90.72%	99.31%	70.56%
2024	90.87%	99.38%	70.65%
2025	91.02%	99.43%	70.73%
2026	91.17%	99.48%	70.82%
2027	91.32%	99.53%	70.89%
2028	91.47%	99.57%	70.97%
2029	91.62%	99.61%	71.05%
2030	91.77%	99.65%	71.12%
2031	91.92%	99.68%	71.19%
2032	92.07%	99.71%	71.26%
2033	92.22%	99.73%	71.33%
2034	92.37%	99.76%	71.40%
2035	92.52%	99.78%	71.46%
2036	92.67%	99.80%	71.53%
2037	92.82%	99.82%	71.59%
2038	92.97%	99.83%	71.65%
2039	93.12%	99.85%	71.71%
2040	93.27%	99.86%	71.77%
2041	93.42%	99.87%	71.82%
2042	93.57%	99.89%	71.88%
2043	93.72%	99.90%	71.93%
2044	93.87%	99.91%	71.98%
2045	94.02%	99.91%	72.03%
2046	94.17%	99.92%	72.08%
2047	94.32%	99.93%	72.13%
2048	94.47%	99.94%	72.18%
2049	94.62%	99.94%	72.22%
2050	94.77%	99.95%	72.27%
2051	94.92%	99.95%	72.31%



10.8.3.27 Annual Additional Staff Recruitment Requirement

Annual Additional Staff Recruitment Requirement

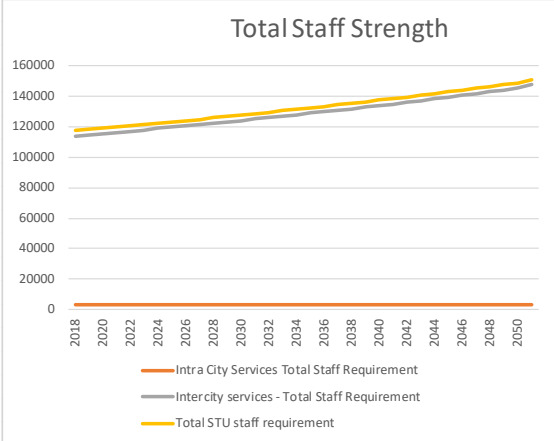
Year	Intra City Services Annual additional staff required	Intercity services - Annual additional staff required	Total annual additional STU staff requirement
2018	0	1381	1381
2019	0	626	626
2020	0	777	777
2021	0	798	798
2022	0	818	818
2023	0	836	836
2024	0	852	852
2025	0	867	867
2026	0	880	880
2027	0	893	893
2028	0	904	904
2029	0	914	914
2030	0	925	925
2031	0	934	934
2032	0	943	943
2033	0	952	952
2034	0	961	961
2035	0	971	971
2036	0	980	980
2037	0	991	991
2038	0	1001	1001
2039	0	1013	1013
2040	0	1025	1025
2041	0	1039	1039
2042	0	1053	1053
2043	0	1071	1071
2044	0	1089	1089
2045	0	1109	1109
2046	0	1132	1132
2047	0	1158	1158
2048	0	1185	1185
2049	0	1218	1218
2050	0	1252	1252
2051	0	2456	2456



10.8.3.28 Total Staff Strength

Total Staff Strength

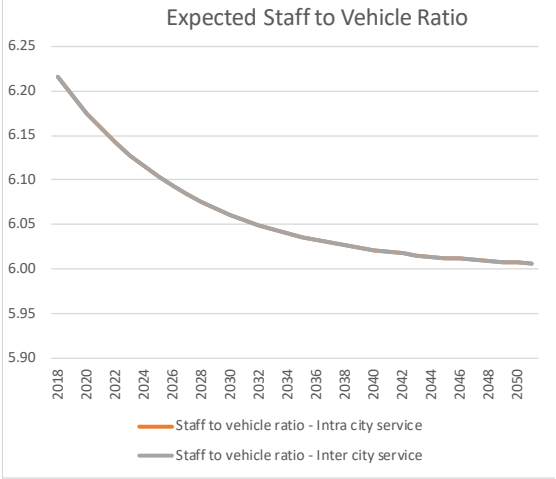
Year	Intra City Services Total Staff Requirement	Intercity services - Total Staff Requirement	Total STU staff requirement
2018	3507	114163	117670
2019	3507	114789	118296
2020	3507	115566	119073
2021	3507	116364	119871
2022	3507	117182	120689
2023	3507	118018	121525
2024	3507	118870	122377
2025	3507	119737	123244
2026	3507	120617	124124
2027	3507	121510	125017
2028	3507	122414	125921
2029	3507	123328	126835
2030	3507	124253	127760
2031	3507	125187	128694
2032	3507	126130	129637
2033	3507	127082	130589
2034	3507	128043	131550
2035	3507	129014	132521
2036	3507	129994	133501
2037	3507	130985	134492
2038	3507	131986	135493
2039	3507	132999	136506
2040	3507	134024	137531
2041	3507	135063	138570
2042	3507	136116	139623
2043	3507	137187	140694
2044	3507	138276	141783
2045	3507	139385	142892
2046	3507	140517	144024
2047	3507	141675	145182
2048	3507	142860	146367
2049	3507	144078	147585
2050	3507	145330	148837
2051	3507	147786	151293



10.8.3.29 Expected Staff to Vehicle Ratio

Expected Staff to Vehicle Ratio

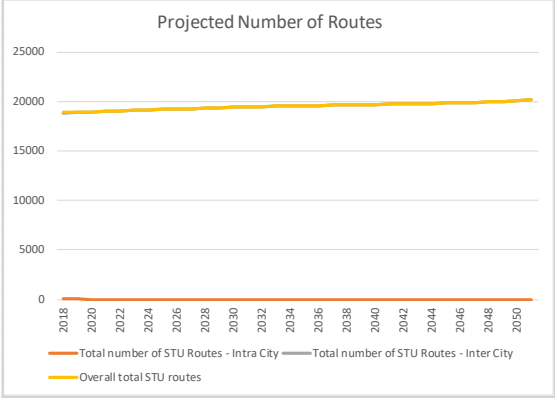
Year	Staff to vehicle ratio - Intra city service	Staff to vehicle ratio - Inter city service
2018	6.22	6.22
2019	6.19	6.19
2020	6.17	6.17
2021	6.16	6.16
2022	6.14	6.14
2023	6.13	6.13
2024	6.11	6.11
2025	6.10	6.10
2026	6.09	6.09
2027	6.08	6.08
2028	6.08	6.08
2029	6.07	6.07
2030	6.06	6.06
2031	6.05	6.05
2032	6.05	6.05
2033	6.04	6.04
2034	6.04	6.04
2035	6.04	6.04
2036	6.03	6.03
2037	6.03	6.03
2038	6.03	6.03
2039	6.02	6.02
2040	6.02	6.02
2041	6.02	6.02
2042	6.02	6.02
2043	6.02	6.02
2044	6.01	6.01
2045	6.01	6.01
2046	6.01	6.01
2047	6.01	6.01
2048	6.01	6.01
2049	6.01	6.01
2050	6.01	6.01
2051	6.01	6.01



10.8.3.30 Projected Number of Routes

Projected Number of Routes

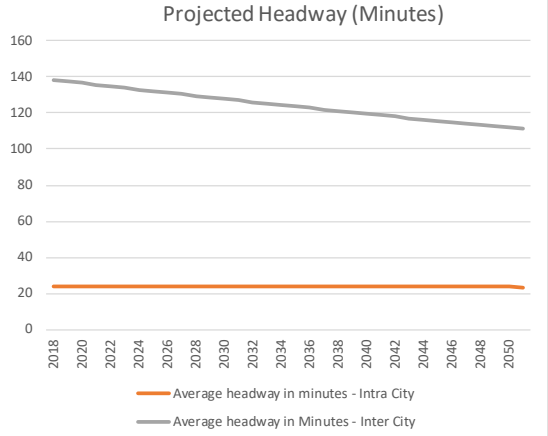
Year	Total number of STU Routes - Intra City	Total number of STU Routes - Inter City	Overall total STU routes
2018	87	18847	18934
2019	30	18890	18920
2020	10	18951	18961
2021	4	19009	19012
2022	1	19064	19065
2023	0	19116	19117
2024	0	19166	19166
2025	0	19213	19213
2026	0	19258	19258
2027	0	19301	19301
2028	0	19342	19342
2029	0	19381	19381
2030	0	19418	19418
2031	0	19453	19453
2032	0	19487	19487
2033	0	19519	19519
2034	0	19550	19550
2035	0	19580	19580
2036	0	19610	19610
2037	0	19638	19638
2038	0	19666	19666
2039	0	19694	19694
2040	0	19721	19721
2041	0	19749	19749
2042	0	19777	19777
2043	0	19805	19805
2044	0	19835	19835
2045	0	19865	19865
2046	0	19897	19897
2047	0	19932	19932
2048	0	19968	19968
2049	0	20007	20007
2050	0	20049	20049
2051	0	20255	20255



10.8.3.31 Projected Headway (Minutes)

Projected Headway (Minutes)

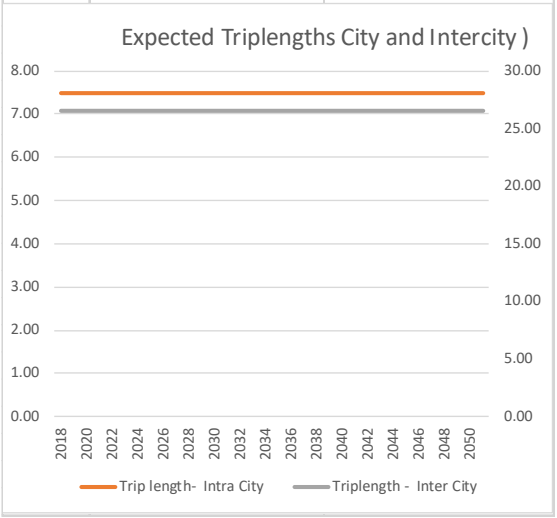
Year	Average headway in minutes - Intra City	Average headway in Minutes - Inter City
2018	24	138
2019	24	138
2020	24	137
2021	24	136
2022	24	135
2023	24	134
2024	24	133
2025	24	132
2026	24	131
2027	24	130
2028	24	129
2029	24	129
2030	24	128
2031	24	127
2032	24	126
2033	24	125
2034	24	124
2035	24	124
2036	24	123
2037	24	122
2038	24	121
2039	24	120
2040	24	120
2041	24	119
2042	24	118
2043	24	117
2044	24	116
2045	24	116
2046	24	115
2047	24	114
2048	24	113
2049	24	113
2050	24	112
2051	24	111



10.8.3.32 Expected Trip Lengths City and Intercity

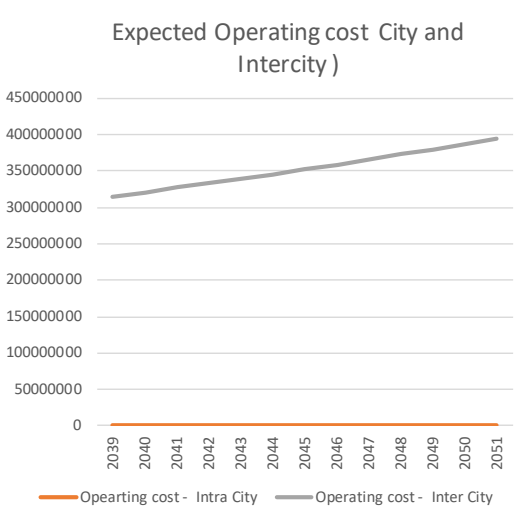
Expected Triplengths City and Intercity

Year	Trip length- Intra City	Triplength - Inter City
2018	7.48	26.57
2019	7.48	26.57
2020	7.48	26.57
2021	7.48	26.57
2022	7.48	26.57
2023	7.48	26.57
2024	7.48	26.57
2025	7.48	26.57
2026	7.48	26.57
2027	7.48	26.57
2028	7.48	26.57
2029	7.48	26.57
2030	7.48	26.57
2031	7.48	26.57
2032	7.48	26.57
2033	7.48	26.57
2034	7.48	26.57
2035	7.48	26.57
2036	7.48	26.57
2037	7.48	26.57
2038	7.48	26.57
2039	7.48	26.57
2040	7.48	26.57
2041	7.48	26.57
2042	7.48	26.57
2043	7.48	26.57
2044	7.48	26.57
2045	7.48	26.57
2046	7.48	26.57
2047	7.48	26.57
2048	7.48	26.57
2049	7.48	26.57
2050	7.48	26.57
2051	7.48	26.57



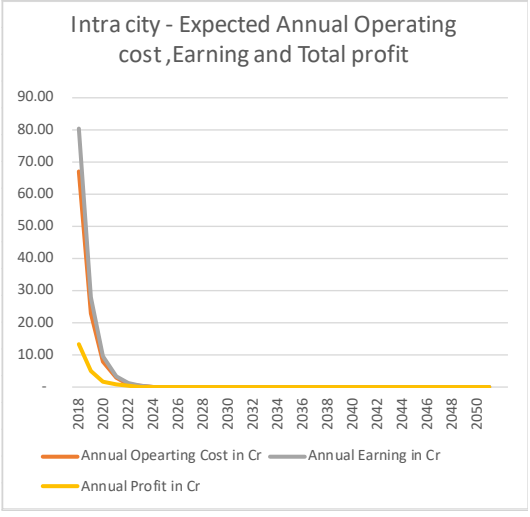
10.8.3.33 Expected Operating cost Intra City and Intercity

Expected Operating cost City and Intercity		
Year	Opearting cost - Intra City	Operating cost - Inter City
2018	1831566	212460556
2019	631256	216327901
2020	217921	220506776
2021	75267	224762641
2022	26008	229094907
2023	8990	233503213
2024	3109	237987425
2025	1076	242547637
2026	372	247184164
2027	129	251897551
2028	45	256688571
2029	15	261558233
2030	5	266507793
2031	2	271538761
2032	1	276652914
2033	0	281852316
2034	0	287139334
2035	0	292516661
2036	0	297987344
2037	0	303554812
2038	0	309222910
2039	0	314995942
2040	0	320878710
2041	0	326876567
2042	0	332995475
2043	0	339242066
2044	0	345623713
2045	0	352148614
2046	0	358825878
2047	0	365665624
2048	0	372679100
2049	0	379878801
2050	0	387278614
2051	0	394893854



10.8.3.34 Intra city - Expected Annual Operating cost, Earning and Total profit

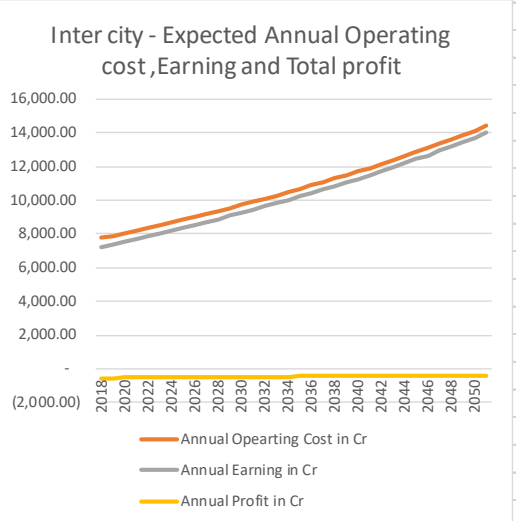
tra city - Expected Annual Operating cost ,Earning and Total prof			
Year	Annual Opearting Cost in Cr	Annual Earning in Cr	Annual Profit in Cr
2018	66.85	80.32	13.47
2019	23.04	27.89	4.85
2020	7.95	9.69	1.73
2021	2.75	3.36	0.62
2022	0.95	1.17	0.22
2023	0.33	0.41	0.08
2024	0.11	0.14	0.03
2025	0.04	0.05	0.01
2026	0.01	0.02	0.00
2027	0.00	0.01	0.00
2028	0.00	0.00	0.00
2029	0.00	0.00	0.00
2030	0.00	0.00	0.00
2031	0.00	0.00	0.00
2032	0.00	0.00	0.00
2033	0.00	0.00	0.00
2034	0.00	0.00	0.00
2035	0.00	0.00	0.00
2036	0.00	0.00	0.00
2037	0.00	0.00	0.00
2038	0.00	0.00	0.00
2039	0.00	0.00	0.00
2040	0.00	0.00	0.00
2041	0.00	0.00	0.00
2042	0.00	0.00	0.00
2043	0.00	0.00	0.00
2044	0.00	0.00	0.00
2045	0.00	0.00	0.00
2046	0.00	0.00	0.00
2047	0.00	0.00	0.00
2048	0.00	0.00	0.00
2049	0.00	0.00	0.00
2050	0.00	0.00	0.00
2051	0.00	0.00	0.00



10.8.3.35 Inter city - Expected Annual Operating cost ,Earning and Total profit

er city - Expected Annual Operating cost ,Earning and Total pro

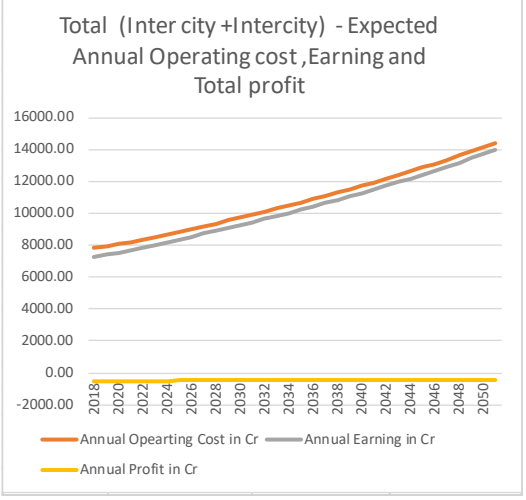
Year	Annual Opearting Cost in Cr	Annual Earning in Cr	Annual Profit in Cr
2018	7,754.81	7,197.84	-556.97
2019	7,895.97	7,357.73	-538.24
2020	8,048.50	7,519.66	-528.84
2021	8,203.84	7,683.67	-520.16
2022	8,361.96	7,849.81	-512.15
2023	8,522.87	8,018.12	-504.75
2024	8,686.54	8,188.65	-497.90
2025	8,852.99	8,361.44	-491.55
2026	9,022.22	8,536.56	-485.66
2027	9,194.26	8,714.07	-480.19
2028	9,369.13	8,894.02	-475.11
2029	9,546.88	9,076.49	-470.39
2030	9,727.53	9,261.55	-465.98
2031	9,911.16	9,449.29	-461.88
2032	10,097.83	9,639.79	-458.04
2033	10,287.61	9,833.14	-454.47
2034	10,480.59	10,029.47	-451.12
2035	10,676.86	10,228.86	-447.99
2036	10,876.54	10,431.47	-445.07
2037	11,079.75	10,637.41	-442.34
2038	11,286.64	10,846.85	-439.78
2039	11,497.35	11,059.95	-437.40
2040	11,712.07	11,276.89	-435.18
2041	11,930.99	11,497.88	-433.12
2042	12,154.33	11,723.13	-431.20
2043	12,382.34	11,952.90	-429.44
2044	12,615.27	12,187.45	-427.81
2045	12,853.42	12,427.09	-426.34
2046	13,097.14	12,672.14	-425.00
2047	13,346.80	12,922.98	-423.81
2048	13,602.79	13,180.02	-422.77
2049	13,865.58	13,443.70	-421.87
2050	14,135.67	13,714.54	-421.13
2051	14,413.63	13,993.07	-420.55



10.8.3.36 Total (Inter city +Intercity) - Expected Annual Operating cost ,Earning and Total profit

r city +Intercity) - Expected Annual Operating cost ,Earning and T

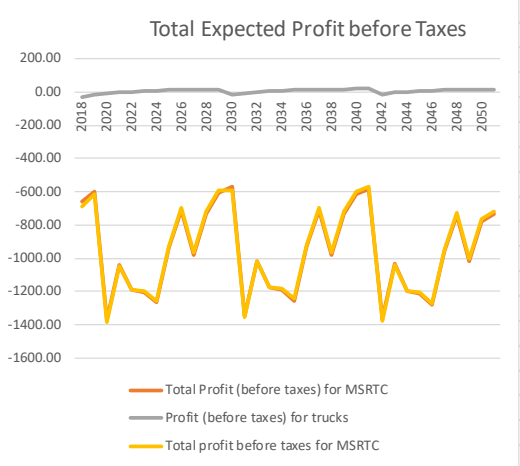
Year	Annual Opearting Cost in Cr	Annual Earning in Cr	Annual Profit in Cr
2018	7821.66	7278.17	-543.50
2019	7919.01	7385.62	-533.39
2020	8056.45	7529.35	-527.11
2021	8206.58	7687.04	-519.55
2022	8362.91	7850.98	-511.93
2023	8523.20	8018.53	-504.67
2024	8686.65	8188.79	-497.87
2025	8853.03	8361.49	-491.54
2026	9022.24	8536.58	-485.66
2027	9194.27	8714.07	-480.19
2028	9369.13	8894.02	-475.11
2029	9546.88	9076.49	-470.39
2030	9727.53	9261.55	-465.98
2031	9911.16	9449.29	-461.88
2032	10097.83	9639.79	-458.04
2033	10287.61	9833.14	-454.47
2034	10480.59	10029.47	-451.12
2035	10676.86	10228.86	-447.99
2036	10876.54	10431.47	-445.07
2037	11079.75	10637.41	-442.34
2038	11286.64	10846.85	-439.78
2039	11497.35	11059.95	-437.40
2040	11712.07	11276.89	-435.18
2041	11930.99	11497.88	-433.12
2042	12154.33	11723.13	-431.20
2043	12382.34	11952.90	-429.44
2044	12615.27	12187.45	-427.81
2045	12853.42	12427.09	-426.34
2046	13097.14	12672.14	-425.00
2047	13346.80	12922.98	-423.81
2048	13602.79	13180.02	-422.77
2049	13865.58	13443.70	-421.87
2050	14135.67	13714.54	-421.13
2051	14413.63	13993.07	-420.55



10.8.3.37 Profit before taxes after Infrastructure development and Fleet Upgradation cost

Profit before taxes after Infrastrucuture development and Fleet Upgradation cost

Year	Total Profit (before taxes) for MSRTC	Profit (before taxes) for trucks	Total profit before taxes for MSRTC
2018	-655.33	-32.25	-687.58
2019	-596.66	-19.54	-616.20
2020	-1370.17	-11.78	-1381.95
2021	-1038.38	-5.49	-1043.87
2022	-1190.39	-0.43	-1190.83
2023	-1201.75	3.63	-1198.12
2024	-1262.15	6.91	-1255.24
2025	-935.06	9.63	-925.43
2026	-711.41	11.82	-699.59
2027	-979.18	13.52	-965.66
2028	-732.32	14.93	-717.39
2029	-607.27	16.06	-591.22
2030	-572.48	-16.11	-588.59
2031	-1345.30	-6.39	-1351.69
2032	-1017.33	-0.95	-1018.27
2033	-1173.51	3.31	-1170.20
2034	-1188.97	6.90	-1182.07
2035	-1253.28	9.62	-1243.66
2036	-929.89	11.68	-918.20
2037	-709.73	13.57	-696.16
2038	-980.82	15.11	-965.71
2039	-737.14	16.14	-721.00
2040	-615.17	17.17	-598.00
2041	-583.37	17.85	-565.52
2042	-1359.13	-14.68	-1373.81
2043	-1034.08	-5.25	-1039.33
2044	-1193.20	-0.04	-1193.24
2045	-1211.63	4.20	-1207.43
2046	-1278.98	7.61	-1271.37
2047	-958.71	10.20	-948.51
2048	-741.82	12.15	-729.67
2049	-1016.33	13.94	-1002.39
2050	-776.27	15.40	-760.87
2051	-732.42	16.37	-716.05



10.9 Meeting Minutes – With Maharashtra State Road Transport Corporation (MSRTC)

Meeting 1: 20.11.2017

Attended by:

Mr. Ranjit Singh Deol, Vice Chairman and Managing Director, MSRTC, Mumbai.

Mr. Sanjay Ganjave, Chief Statistical Officer, MSRTC, Mumbai.

Mrs. Sandhya Bhandarwar, Statistical Officer, MSRTC, Mumbai.

Mr. Ashok Phalnikar, Financial Advisor, MSRTC, Mumbai.

Capt. Vinod Ratnaparkhi, General Manager (Planning), MSRTC, Mumbai.

Capt. Rajkumar Patil, General Manager (Transport), MSRTC, Mumbai.

Mr. Vasant Gaydhani, General Manager (Mechanical), MSRTC, Mumbai.

Mr. Rajendra Jawanjal, General Manager (Civil), MSRTC, Mumbai.

Mr. Sandeep Gandhi, SGArchitects, New Delhi

Mr. Pushkar Dhawale, SGArchitects, New Delhi

Venue: MSRTC office, Mumbai Central, Mumbai.

Minutes:

- The meeting was presided by Shri Deol, VC & MD, MSRTC
- Mr. Sandeep Gandhi explained the "Roadmap for Bus fleet and Infrastructure development project" through a power point presentation.
- The presentation included project background, project scope, objectives, methodology, timeline and initiating steps required (including data collection requirements).
- Mr. Gandhi also explained to Mr. Deol, the background work done as part of other projects, which forms the basis of this project. This includes, bus terminal and depot design guidelines, Himachal fleet estimation report, etc.

- Mr. Gandhi also presented theMSRTC specific inception report for the project to Mr. Ranjit Singh Deol.
- SGA team also clarified that the three STUs were selected for the same project including MSRTC, APSRTC and J & K.
- Mr. Ranjit Singh Deol asked to explain the base data of Himachal Fleet estimation tool and Mr. Sandeep Gandhi gave the brief introduction of the tool.
- Capt. Rajkumar Patil asked SGA team to study the present operational and traffic scenarios, role of MSRTC and private operators, reasons of passenger attraction towards private buses, etc.
- Mr. Ranjit Singh Deol explained that the MSRTC is observing big competition from private bus operators, jeep/taxis in intercity operations and from taxis/IPT/chakda in intracity operations.
- Mr. Ranjit Singh Deol appointed Shri Ganjave as the nodal officer for the project and asked SGA team to co-ordinate with him for data collection.
- Mr. Ganjave suggested that the similar kind of data was collected by A.T. Kearney.
- Capt. Rajkumar Patil and Mr. Ashok Phalnikar requested SGA team to explain the fleet estimation tool in detail and asked the question related to resource mobilization, area wise travel scenarios, ways to fulfil passenger demand, etc. Mr. Sandeep Gandhi explain the tool and working of tool in detail.
- Mr. Gandhi discussed the salient features of the tool in detail with all officials, following which SGA team sought separate meeting appointments with all present.

Meeting 2: 20.11.2017

Attended by:

Mr. Rajendra Jawanjal, General Manager (Civil), MSRTC, Mumbai.

Mr. Sandeep Gandhi, SGArchitects,

Mr. Pushkar Dhawale, SGArchitects

- Mr. Sandeep Gandhi explained the objectives of the project with reference to immediate gap assessment of MSRTC depot and terminal infrastructure. He explained how this gap assessment needs to be achieved through primary data collection, using two separate forms.
- Mr. Jawanjal, inquired about what improvements are likely to be suggested for the infrastructure. He informed that team, that the civil department regularly undertakes repair and maintenance of all MSRTC infrastructure.
- Basis his discussion with the project team, Mr. Jawanjal, introduced the team to Mr. Prashant Potadar, in his office. He suggested that Mr. Potadar be contacted for any civil related data.

Meeting 3: 20.11.2017

Attended by:

Mr. Sanjay Ganjave, Chief Statistical Officer, MSRTC, Mumbai.

Mrs. Sandhya Bhandarwar, Statistical Officer, MSRTC, Mumbai.

Mr. Sandeep Gandhi, SGArchitects, New Delhi

Mr. Pushkar Dhawale, SGArchitects, New Delhi

Venue: MSRTC office, Mumbai Central, Mumbai.

Minutes:

- Mr. Sandeep Gandhi explained the project background and purpose of the study to Mr. Ganjave.
- Three Survey format including MSRTC data collection survey format, Bus stand data collection survey format and depot data collection survey format have been presented and discussed with MSRTC officials.
- Mr. Ganjave described the MSRTC structure including number of terminals and depots, operational structure and hierarchy. He also explained the general structure and planning concept of MSRTC terminals and depots.
- Mr. Ganjave explained planning and operational strategies used in MSRTC terminals and depots and suggested to eliminate common data/questions from the terminal and depot survey format.
- SGA team agreed on the need for redesign of the terminal and depot survey format according to MSRTC requirements, under the guidance of Mr. Ganjave and Mrs. Bhandarwar.
- A detailed discussion on each point/question listed and depot and terminal data collection form, followed.
- Mr. Ganjave, directed the project team to the offices of Shri Rajkumar Patil for further diuscussions on MSRTC operations.

Meeting 4: 20.11.2017

Attended by:

Capt. Rajkumar Patil, General Manager (Transport), MSRTC, Mumbai.

Mr. Sandeep Gandhi, SGArchitects, New Delhi

Mr. Pushkar Dhawale, SGArchitects, New Delhi

Venue: MSRTC office, Mumbai Central, Mumbai.

Minutes:

- Capt. Rajkumar Patil explained the existing operation strategy used for MSRTC. He shared the operational data compilation process for MSRTC, which is analyzed and compared (with previous years) on daily, monthly and annual basis. He explained on what actions are taken on an immediate basis in case of any shortfalls in operational efficiency or ridership.
- Capt. Patil, understood from the team, the fleet estimation process and its limitation.
- SGA team enquired from Mr. Patil, on what would be his expectation of outcomes from the project.
- To this Mr. Patil responded by saying that what would be of interest to him is the details of trip length undertaken by commuters as of date in Maharashtra.

Meeting 5: 21.11.2017

Attended by:

Mr. Vasant Gaydhani, General Manager (Mechanical), MSRTC, Mumbai.

Mr. Sandeep Gandhi, SGArchitects, New Delhi

Venue: MSRTC office, Mumbai Central, Mumbai.

Minutes:

- Mr. Gandhi explained to Mr. Gaydhani, the details of the data to be collected during this visit.
- Mr. Gaydhani provided data on types of buses operated by MSRTC along with their age. He also provided the details of fleet size and its composition by bus type and service type.
- Mr. Gaydhani also shared details of average operational life of a bus, along with rough/estimated cost of each bus type. He also shared.
- Mr. Gaydhani also shared details on vehicle utilization and fleet utilization, along with estimates of depot mechanic staff strength.
- Mr. Gandhi thanked Mr. Gaydhani for the data shared and informed him that it will take 3 to 4 weeks to process the information collected in this visit, post which we will visit him with the analysis or any further data requirements.

Meeting 6: 21.11.2017

Attended by:

Mr. Sanjay Ganjave, Chief Statistical Officer, MSRTC, Mumbai.

Mrs. Sandhya Bhandarwar, Statistical Officer, MSRTC, Mumbai.

Mr. Sandeep Gandhi, SGArchitects, New Delhi

Mr. Pushkar Dhawale, SGArchitects, New Delhi

Venue: MSRTC office, Mumbai Central, Mumbai.

Minutes:

- Basis the discussion of the SGA team with Mr. Ganjave on 20.11.17, SGA team submitted the revised form for depot and terminal data collection.
- Mr. Ganjave informed the project team that he will now initiate the circulation of the revised form to all depots and terminals.
- Mr. Ganjave discussed in detail, the, MSRTC secondary data collection format.
- Mr. Ganjave and Mrs. Bhandarwar provided the useful data and related links/reports.
- Mr. Ganjave, edited the data requirement on the basis of the format in which the data is available with MSRTC.
- Also, SGA team and MSRTC officials listed down the data which was not available in reports/on website. Mr. Ganjave assured SGA team that the remaining/listed data for the current year shall be shared by mail soon.

Meeting 7: 21.11.2017

Attended by:

Capt. Vinod Ratnaparkhi, General Manager (Planning), MSRTC, Mumbai.

Mr. Sandeep Gandhi, SGArchitects, New Delhi

Mr. Pushkar Dhawale, SGArchitects, New Delhi

Venue: MSRTC office, Mumbai Central, Mumbai.

Minutes:

- Capt. Vinod Ratnaparkhi briefly explained the MSRTC marketing strategy. He highlighted that current MSRTC fare is not only higher than other STUs but is also higher than private operators.
- He explained that even with reciprocatory or similar fare for services between Maharashtra and Mumbai, Karnataka State Road Transport Corporation (KSRTC) attracts higher occupancy and ridership than MSRTC.
- He also explained that, at present, the fare is calculated by automatic fare upgradation formula. The formula is based on price/cost to the corporation - four components i.e. diesel cost, chassis cost, tyre cost and dearness allowance.
- Capt. Vinod Ratnaparkhi suggested that the project team as a part of the study include findings on:
  1. Suggestions on revising the existing fare structure
  2. Suggestions to include flexible/dynamic fare strategies
- Capt. Vinod Ratnaparkhi agreed to provide the required data and introduced Mr. Deshpande to assist in data collection.
- Capt. Ratnaparkhi also informed the team that MSRTC will gradually phase out all regular buses in the next 5 to 10 years and the same will be replace by A/C buses. MSRTC has already initiated induction of these buses and 119 of them have been inducted. These are called Shivshahi service. He suggested that within a year 2000 such buses will be in service with MSRTC out of which 1500 shall be rented.
- Capt. Ratnaparkhi shared details of the per km cost rent for the rental buses.

- Capt. Ratnaparkhi also informed the project team, about Jalna DC, Mr. Prashant Ghozari, who has some useful ideas on improving MSRTC service and who may also be consulted.

Meeting 8: 21.11.2017

Attended by:

Mr. Ashok Phalnikar, Financial Advisor, MSRTC, Mumbai.

Mr. Sandeep Gandhi, SGArchitects, New Delhi

Venue: MSRTC office, Mumbai Central, Mumbai.

Minutes:

- Mr. Gandhi explained to Mr. Phalnikar, the details of the data collected during this visit.
- It was decided that the project team shall analyses the collected data and then come back and discuss any specific cost or revenue related queries, with Mr. Phalnikar in 3 to 4 weeks' time.

10.10 Secondary Data Checklist for STU's

SECONDARY DATA CHECK LIST FOR STU's

Data Requirement for Year 2017							
Total Fleet Size		**Intercity/Mofussil /Rural**	..... *in numbers*		**Intracity/City Operations**	..... *in numbers*	
Bus type	Regular- Diesel, Regular -CNG, Mini, Midi, Luxury, AC-coaches or any Other type			**Average Seating Capacity** *(in numbers)*			
Seating Capacity *(individual)*	Regular Diesel -	Regular CNG -	Mini -	Midi -	Ac coaches -	Luxury -	Other - .....

A. APSRTC Fleet Break up:

A.	**Intercity /Mofussil / Rural**	**Number of Buses**										
S.no	**Bus type** (Regular-Diesel, Regular -CNG, Mini, Midi, Luxury, AC-coaches or any Other type)	< 1 Year	1 to 2 Year	2 to 3 Year	3 to 4 Year	4 to 5 Year	5 to 6 Year	6 to 7 Year	7 to 8 Year	8 to 9 Year	9 to 10 Year	> 10 years
1												
2												
3												
4												
5												
6												
B.	**Intracity /City Operations**	**Number of Buses**										
1												
2												
3												
4												
5												
6												

pg. 1

SECONDARY DATA CHECK LIST FOR STU's

B. Operational details:

No.	Data for Year 2016/2017	Intercity /Mofussil / Rural	Intracity /City operations	Comments
1	Total Number of trips undertaken by STU -			
2	Scheduled trips by STU –			
3	Total Km covered per day –			
4	Planned Km covered per day			
5	Current year fleet utilization (%) –			
	Vehicle Utilization in Km –			
6	Operational Hours			
7	No. of daily STU Trips (Nos.)-			
8	Total No. of routes operated daily (Nos.) -			
9	Total route length (km)			
10	Average route length (km)			
11	Average occupancy (Nos.)			
12	Average staff per bus (ratio)			
13	Current STU Bus daily ridership (Nos.) –			
14	Average speed of the buses (km/hr)			

C. Annual Revenue details:

Nos.	Service Revenues	Bus Fleet	Depot	Terminal	Nos.	Non-Service Revenues	Cost *(in Rs.)*
1	Annual Operational cost *(in Rs.)*				1	Monthly Advertisement revenue from buses	
2	Total buses accommodating capacity	---			2	Advertisement revenue from infrastructure	*Depot-*
3	Total land area under -	---					*Terminal-*
4	Postal/Courier service revenue				3	Any other	
5	Contract revenue				a		
6	Hiring of vehicles revenue				b		
7	Total Land holding with STU *(sq.m)*				c		
Nos.	**Non-Traffic Revenues**	**Cost *(in Rs.)***			**Nos.**	**Non-Traffic Revenues**	**Cost *(in Rs.)***
1	Subsidy/Concession				4	Parking Revenue:	
2	Rent of shops						
3	Sell of Scrap				5	Licence fees	
4	Lease & other real estate revenues				6	Private Bus Parking	

SECONDARY DATA CHECK LIST FOR STU's

D. Annual Expenditure details:

Nos.	Particulars	Cost *(in Rs.)*	Nos.	Particulars	Cost *(in Rs.)*
1	Total staff salary *(including Provident Fund & Gratuity & any other personal development cost like training, workshop, etc.)*		8	Payment for hiring buses	
2	Ticket printing cost		9	Depot infrastructure cost	
3	Cleaning and sweeping charges		10	Terminal infrastructure cost	
4	Total Fuel expenditure		11	Bus fleet maintenance cost	
5	Total Tax expenditure		12	**Loan:** Total Loan amount	
6	Payment for hiring buses			Annual interest on loan	
7	Depot infrastructure cost			Principal amount of loan	

E. Fare and Revenue details (as per service type):

Particulars	Vehicle type	Fare Box Revenue	Total Km	Total Passenger Trips	Total Passenger Km	Average per Passenger fare	Remarks
Service 1							
Service 2							
Service 3							
Service 4							
Service 5							
Service 6							

***As part of secondary data collection** ** following will be required:

1. Traffic data (such as – bus flow /hour, capacity, crew handled and any other specific requirements for terminal and depots)
2. Any Proposal, Prior studies and reports.

Name – .....

Designation – .....

Contact Number - .....

10.11 Meeting Minutes on 17th & 18th July 2018

Roadmap for Bus fleet and Infrastructure development for State Transport Undertaking

Meeting Minutes July 17 & 18 2018

Maharashtra State Road Transport Corporation (MSRTC)

Meeting 1: 17.07.2018

Attended by:

Mr. Sanjay Ganjave, Chief Statistical Officer, MSRTC, Mumbai.

Mrs. Sandhya Bhandarwar, Statistical Officer, MSRTC, Mumbai.

Mr. Satyajit Ganguly, SGArchitects, New Delhi

Mr. Pushkar Dhawale, SGArchitects, New Delhi

Venue: MSRTC office, Mumbai Central, Mumbai.

Minutes:

- Mr. Satyajit Ganguly & Mr. Pushkar Dhawale explained the final presentation on "Roadmap for Bus fleet and Infrastructure development project".
- Mr. Sanjay Ganjve suggested to correct the terminologies, used in presentation and tool, as per the MSRTC terminologies.
- SGA team discussed and confirmed the outcomes of tool and explained the profitability scenario with officials. Mrs. Bhandarwar suggested to rectified values as inputs values for BAU scenario.
- Mr. Ganjve also asked to change the colours in graphs to avoid confusion.
- SGA team explained the expenditure calculations with includes operational cost, bus procurement and infrastructure development cost for bus depots and terminals. Mr. Ganjve asked to calculate and present losses and bus procurement, infrastructure cost separately in the graphs.
- Mr. Ganjve asked SGA team to correct the required changes and send the corrected file as soon possible.
- The meeting concluded with acceptance of designed tool and presentation by Mr. Ganjve.

Meeting 1: 17.07.2018

Attended by:

Mr. Rajendra Jawanjal, General Manager (Civil), MSRTC, Mumbai.

Mr. Kulkarni, Civil Officer, MSRTC, Mumbai.

Mr. Sanjay Ganjave, Chief Statistical Officer, MSRTC, Mumbai.

Mr. Satyajit Ganguly, SGArchitects, New Delhi

Mr. Pushkar Dhawale, SGArchitects, New Delhi

Venue: MSRTC office, Mumbai Central, Mumbai.

Minutes:

- Mr. Pushkar Dhawale explained that, in continuation of "Roadmap for Bus fleet and Infrastructure development project", SGA need to develop two retrofitting designs for MSRTC terminals or depots. And also asked for appropriate sites for same project.
- Mr. Jawanjal suggested two sites (Parel, Mumbai and Pimpri-Chinchwad, Pune) for retrofitting. And also assured to provide 'site visit permission letter' and required data for design.
- Mr. Jawanjal asked Mr. Kulkarni to provide existing plans for both the sites.
- The meeting concluded with receiving scan copy of both the plans.

10.12 Meeting Minutes on 23rd July 2018

Roadmap for Bus fleet and Infrastructure development for State Transport Undertaking

Meeting Minutes July 23rd, 2018

Maharashtra State Road Transport Corporation (MSRTC)

Meeting 1: 23. 8.2018

Attended by:

Mr. Ranjit Singh Deol, Vice Chairman and Managing Director, MSRTC, Mumbai.

Mr. Sanjay Ganjave, Chief Statistical Officer, MSRTC, Mumbai.

Mrs. Sandhya Bhandarwar, Statistical Officer, MSRTC, Mumbai.

Mr. Ashok Phalnikar, Financial Advisor, MSRTC, Mumbai.

Capt. Vinod Ratnaparkhi, General Manager (Planning), MSRTC, Mumbai.

Capt. Rajkumar Patil, General Manager (Transport), MSRTC, Mumbai.

Mr. Vasant Gaydhani, General Manager (Mechanical), MSRTC, Mumbai.

Mr. Rajendra Jawanjal, General Manager (Civil), MSRTC, Mumbai.

Mr. Sandeep Gandhi, SGArchitects, New Delhi

Mr. Satyajit Ganguly, SGArchitects, New Delhi

Mr. Pushkar Dhawale, SGArchitects, New Delhi

Venue: MSRTC office, Mumbai Central, Mumbai.

Minutes:

- The meeting was presided by Shri Deol, VC & MD, MSRTC
- Mr. Sanjay Ganjve gave a brief introduction of the project.
- Mr. Satyajit Ganguly initiated the "Roadmap for Bus fleet and Infrastructure development project" through a power point presentation.
- The presentation included all the exercises undertaken – fleet estimation, budgetary requirements, Infrastructure gap analysis, desirable scenario and factors of profitability along with the final outputs as gained for MSRTC.
- While presenting infrastructure gap analysis Mr. Ranjit Singh Deol asked to explain the base of the standards used for identifying existing gaps.
- Mr. Sandeep Gandhi explained Mr. Deol that the comparison has done on the basis of the standards prescribed in the Bus terminal and Depot guidelines.
- Mr. Satyajit continued with the presentation and discussed the salient features in detail with all officials.
- The presentation concluded with a discussion on how MSRTC can attain profits or reduce loss in the future.
- For this, factors of profitability and their impacts were elaborated to the MSRTC officials by Mr. Sandeep Gandhi.

- Mr. Deol desired it would be more helpful if applicability of the identified factors of loss reduction can be explored in detail.
- The project team assured Mr. Deol that they will incorporate the application of loss reduction for MSRTC along with their action plans and implementation technique in the final report.

10.13 Secondary Data Checklist for STU's

SECONDARY DATA CHECK LIST FOR STU's

Data Requirement for Year 2017							
Total Fleet Size		**Intercity/Mofussil /Rural**	..... *in numbers*		**Intracity/City Operations**	..... *in numbers*	
Bus type	Regular- Diesel, Regular -CNG, Mini, Midi, Luxury, AC-coaches or any Other type			**Average Seating Capacity** *(in numbers)*			
Seating Capacity *(Individual)*	Regular Diesel -	Regular CNG -	Mini -	Midi -	Ac coaches -	Luxury -	Other - .....

A. APSRTC Fleet Break up:

A.	**Intercity /Mofussil / Rural**	**Number of Buses**										
S.no	**Bus type** (Regular- Diesel, Regular -CNG, Mini, Midi, Luxury, AC-coaches or any Other type)	< 1 Year	1 to 2 Year	2 to 3 Year	3 to 4 Year	4 to 5 Year	5 to 6 Year	6 to 7 Year	7 to 8 Year	8 to 9 Year	9 to 10 Year	> 10 years
1												
2												
3												
4												
5												
6												
B.	**Intracity /City Operations**	**Number of Buses**										
1												
2												
3												
4												
5												
6												

pg. 1

SECONDARY DATA CHECK LIST FOR STU's

B. Operational details:

No.	**Data for Year 2016/2017**	**Intercity /Mofussil / Rural**	**Intracity /City operations**	**Comments**
1	Total Number of trips undertaken by STU -			
2	Scheduled trips by STU –			
3	Total Km covered per day –			
4	Planned Km covered per day			
5	Current year fleet utilization (%) –			
	Vehicle Utilization in Km –			
6	Operational Hours			
7	No. of daily STU Trips (Nos.)-			
8	Total No. of routes operated daily (Nos.) -			
9	Total route length (km)			
10	Average route length (km)			
11	Average occupancy (Nos.)			
12	Average staff per bus (ratio)			
13	Current STU Bus daily ridership (Nos.) –			
14	Average speed of the buses (km/hr)			

C. Annual Revenue details:

Nos.	**Service Revenues**	**Bus Fleet**	**Depot**	**Terminal**	**Nos.**	**Non-Service Revenues**	**Cost** *(in Rs.)*
1	Annual Operational cost *(in Rs.)*				1	Monthly Advertisement revenue from buses	
2	Total buses accommodating capacity	---			2	Advertisement revenue from infrastructure	*Depot-*
3	Total land area under -	---					*Terminal-*
4	Postal/Courier service revenue				3	Any other	
5	Contract revenue				a		
6	Hiring of vehicles revenue				b		
7	Total Land holding with STU *(sq.m)*				c		
Nos.	**Non-Traffic Revenues**	**Cost** *(in Rs.)*			**Nos.**	**Non-Traffic Revenues**	**Cost** *(in Rs.)*
1	Subsidy/Concession				4	Parking Revenue:	
2	Rent of shops						
3	Sell of Scrap				5	Licence fees	
4	Lease & other real estate revenues				6	Private Bus Parking	

pg. 2

SECONDARY DATA CHECK LIST FOR STU's

D. Annual Expenditure details:

Nos.	Particulars	Cost *(in Rs.)*	Nos.	Particulars	Cost *(in Rs.)*
1	Total staff salary *(including Provident Fund & Gratuity & any other personal development cost like training, workshop, etc.)*		8	Payment for hiring buses	
2	Ticket printing cost		9	Depot infrastructure cost	
3	Cleaning and sweeping charges		10	Terminal infrastructure cost	
4	Total Fuel expenditure		11	Bus fleet maintenance cost	
5	Total Tax expenditure		12	**Loan:** Total Loan amount	
6	Payment for hiring buses			Annual interest on loan	
7	Depot infrastructure cost			Principal amount of loan	

E. Fare and Revenue details (as per service type):

Particulars	Vehicle type	Fare Box Revenue	Total Km	Total Passenger Trips	Total Passenger Km	Average per Passenger fare	Remarks
Service 1							
Service 2							
Service 3							
Service 4							
Service 5							
Service 6							

***As part of secondary data collection** ** following will be required:

1. Traffic data (such as – bus flow /hour, capacity, crew handled and any other specific requirements for terminal and depots)
2. Any Proposal, Prior studies and reports.

Name – .....

Designation – .....

Contact Number - .....