

Public Private Partnership Models for Development of Sustainable Urban Transport Systems



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List of Abbreviations

AICTSL	Atal Indore City Transport Service Limited
AMRUT	Atal Mission For Rejuvenation And Urban Transformation
ATC	Area Traffic Control
BOT	Build Operate and Transfer
BRTS	Bus Rapid Transit System
CMP	Comprehensive Mobility Plan
DoEF	Department of Economic Affairs
FY	Financial year
FYP	Five year plan
GCC	Gross Cost Contract
GMADA	Greater Mohali Area Development Authority
GoI	Government of India
GPS	Global Positioning System
HUDA	Hyderabad Urban Development Authority
HSD	High Speed Diesel
ICT	Information and Communication Technologies
IPT	Intermediate Public Transport
ITS	Intelligent Transport System
KPI	Key Performance Indicator
MoF	Ministry of Finance
MoUD	Ministry of Urban Development
MRT	Mass Rapid Transit
NPBS	National Public Bicycle Scheme
MS	Motor Spirit
MSL	Minimum Service Levels
NCC	Net Cost Contract
NMT	Non-Motorised Transport
NPBS	National Public Bicycle Scheme
NTDPC	National Transport Development Policy Committee
NUTP	National Urban Transport Policy
O&M	Operations and Maintenance
PBS	Public Bicycle Sharing
PIS	Public Information System
PPP	Public Private Partnership
PWD	Public Works Department
SAAP	State Annual Action Plan
SLB	Service Level Benchmark
SPV	Special Purpose Vehicle
STU	State Transport Undertaking
TOD	Transit Oriented Development
ToR	Terms of Reference
ULB	Urban Local Body
UMTA	Urban Metropolitan Transport Authority
UTF	Urban Transport Fund
VGf	Viability Gap Funding

EXECUTIVE SUMMARY

Urban transport is a critical component of urban infrastructure and the lifeline of a city. A well-developed and planned transportation system is integral to the development of social activity and accelerates economic growth. With the burgeoning rate of population and expanding urbanization, requirement of urban transport infrastructure and associated funding needs are growing at rapid pace, resulting in an ever increasing gap between supply and demand.

Traditionally, financing of urban transport projects in the country has largely been confined to gross budgetary support from the government and revenue from user charges. Due to relative lack of appreciation of heavy investment needs of urban transport and conflicting demands on the general exchequer, investment in urban transport in past has not kept pace with the rapidly increasing requirement of the sector. Considering the importance of this sector, the Government of India (GoI) in its 12th Five Year Plan (FYP) has estimated INR 202,628 crores investment in public transport and other associated infrastructure and INR 167,218 crores investment specifically in street infrastructure. The investment in urban infrastructure as estimated by the High Power Expert Committee set up by the Ministry of Urban Development, Government of India for the period 2012 – 2031 (12th FYP to 15th FYP) also indicates a huge requirement of INR 39,20,000 crore.

It is understood that the public sector would continue to play an important role in building urban transport infrastructure. However, the resources needed are much more than the public sector can provide and public investment will therefore have to be supplemented by private sector investments.

In order to address this gap, the GoI is focusing on leveraging investments from private sector through Public Private Partnership (PPP) and has emphasised this in the Smart Cities Mission, Atal Mission for Transformation and Urban Rejuvenation (AMRUT) as well as the National Urban Transport Policy (NUTP). Traditionally, PPP analysis has been carried out primarily from a financial point of view, but policy and planning barriers often hamper the successful implementation of PPP projects in urban transport infrastructure. This report analyses PPP in urban transport infrastructure in an integrated manner and the identified barriers and proposed recommendations cover all aspects holistically.

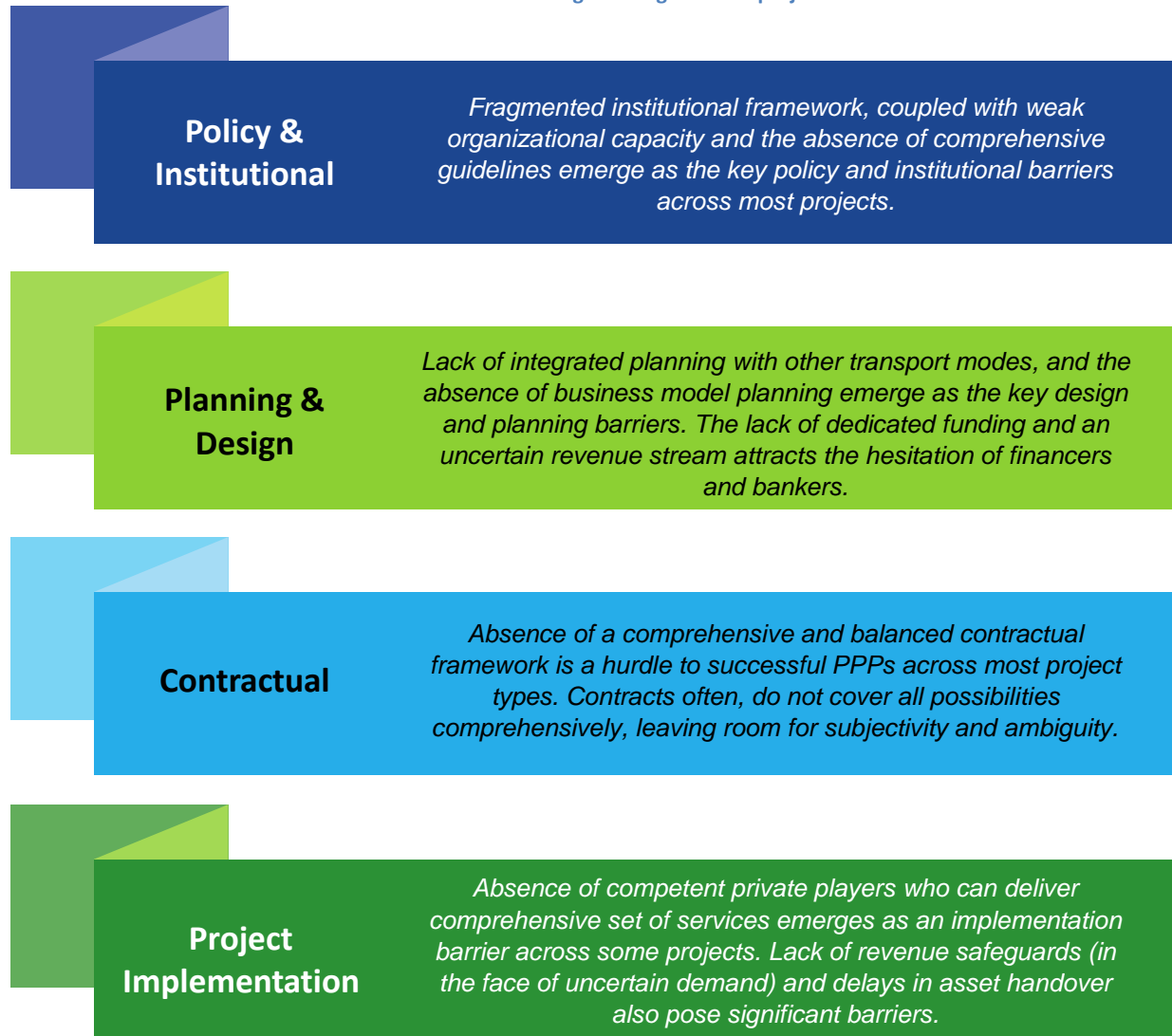
With the above background, the report identifies key barriers to the success of PPP in urban transport infrastructure space particularly in bus terminals development and operation, Public Bicycle Sharing (PBS), city bus private operations, street infrastructure and Intelligent Transport System (ITS). The barriers have been analysed from institutional, planning, and contractual and implementation perspectives, and recommendations are provided to address the identified barriers. Subsequently, various types of PPP models have been developed for each sector, as an attempt to enable successful PPP contracting and implementation in urban transport infrastructure projects.

Key barriers to PPP in urban transport infrastructure projects

At the **policy and institutional level**, there is a common thread in all five identified PPP opportunities. There is a lack of horizontal and vertical coordination among institutions at central, state and local levels and the policy intent at the national and state levels is often not translated to projects implemented at the city level, which makes accountability difficult. Although national-level policies broadly cover the institutional aspect of urban transport, there is limited focus on the institutional aspect for facilitating PPPs within the sector. At the **planning and design level**,

again a common thread is present in all the five project types. There is a lack of comprehensive and integrated planning, which when coupled with the presence of multiple agencies involved in the planning stage, has led to fragmented infrastructure and services leading to failure in such projects. Another planning barrier is the lack of clarity on business model or suitable business plan before implementing PPP projects in urban transport infrastructure. Absence of dedicated funding for financing PPP projects is a hurdle which has recently seen some support from the government in through various Central Government sponsored schemes such as Smart Cities Mission, AMRUT etc. However, this funding support often does not prioritise urban transport infrastructure projects and budgetary allocation for projects like PBS and street infrastructure.

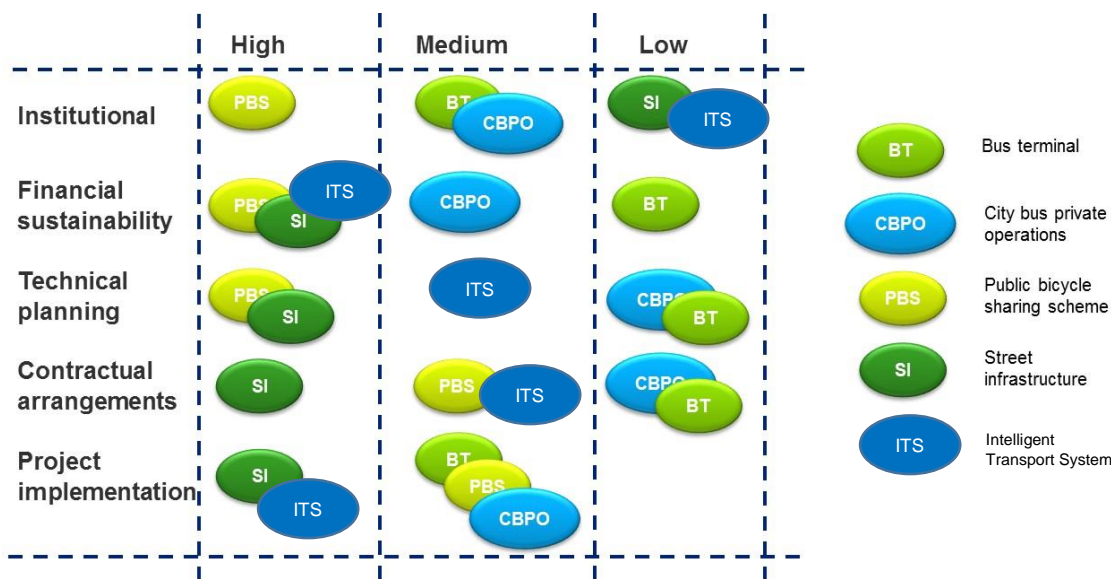
Exhibit 1: Cross-cutting challenges across projects



At the **contractual level**, there are two threads present. In city bus private operations and bus terminal projects, risk allocation between the public authority and the private sector player is not balanced in existing contracts. A recurring problem is the lack of clearly defined roles and responsibilities, rights and obligations, and comprehensive coverage of all contractual clauses. At the **implementation level**, a common barrier across projects is delay in issuing approvals and permits, and acquisition/ provisioning of land by authorities. Such delays escalate costs for

the private operator(s) with no associated safeguards. For some sectors, there is a dearth of competent operators from the private sector.

Exhibit 2: Intensity of key barriers to PPP



Based on analysis and stakeholder discussions, the key barriers have been mapped project-wise on a scale of high-medium-low and presented in the adjoining exhibit. It can be interpreted that for PBS and street infrastructure projects, the barriers are higher than other projects to implement an effective PPP project.

Common recommendations to address barriers

Having captured and analysed the barriers, the report provides action-oriented recommendations to address the barriers. It emerges that a conducive environment needs to be provided for the private sector to be willing to enter into urban transport infrastructure projects, and share risks involved in such projects. Across all reviewed projects, some common recommendations emerge in order to make PPPs successful. These are captured in the adjoining exhibit and are discussed herein. At the policy and institutional level, a single authority needs to be made in-charge for implementing a project, and institutional fragmentation needs to be addressed. Planning forms the backbone of any project, and in case of PPP contracts, wherein multiple parties are involved, planning assumes an even more important role. Both financial and technical aspects of projects need to be methodologically planned.

Exhibit 3: Common recommendations across projects



Private operators opine that the spirit of "partnership" needs to be ingrained in PPP contracts, and private players must be treated as "partners" in the system. Contractual arrangements must give fair consideration to the risks being assumed by the private operator(s), and sufficient revenue safeguards must be imbedded in the contracts. Also, contracts must be made flexible enough to incorporate change of scope arising from unforeseen circumstances beyond the control of the private operators. From an implementation perspective, it emerges that the clauses for conditions precedent and termination payments must be implemented effectively, so as to ensure that the private operators are cushioned against any losses arising on account of uncontrollable factors.

Based on the recommendations for enabling successful PPPs in the identified sectors, business models have been developed through which private participation can be sought. In order to successfully implement projects through PPP mode, risks must be assigned to the party that can best manage them, and the strengths of the private operators must be exploited fully. The value chain activities of an urban transport infrastructure project within the stages of planning and designing, implementation and operation & management have been described. Based on the allocation of responsibilities between the public authority and the private operator(s), PPP models have been developed. The broad approach for developing these models is described in the adjoining exhibit. The developed models have been evaluated on parameters such as financial feasibility, need for monitoring by Authority, potential incentives for private operator(s) and operational efficiency etc.

Exhibit 5: Methodology for development of PPP models

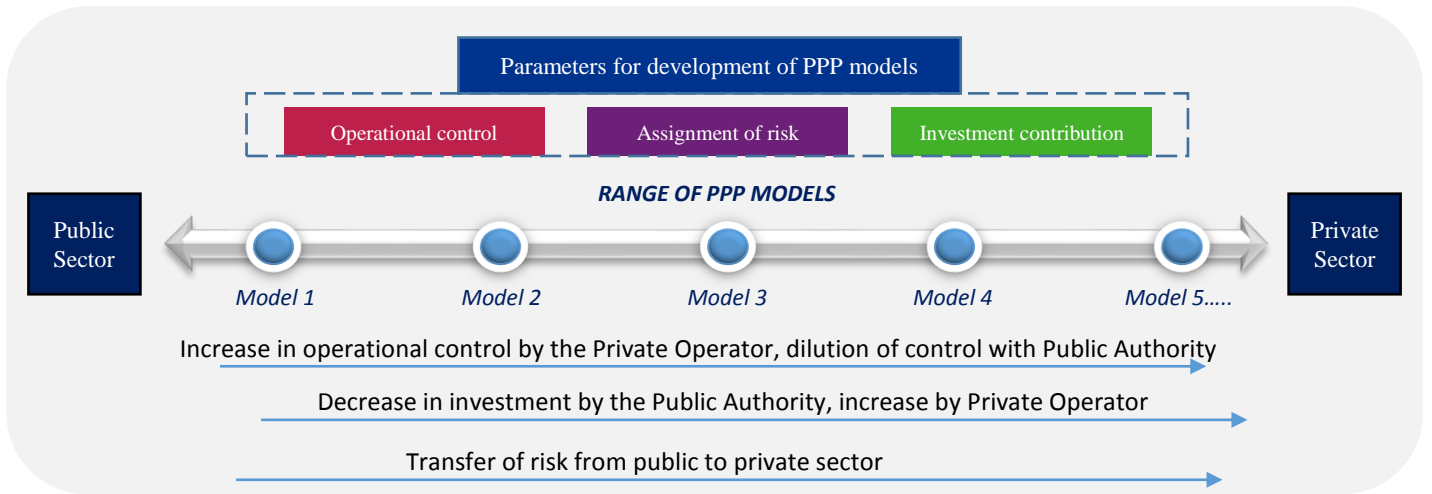
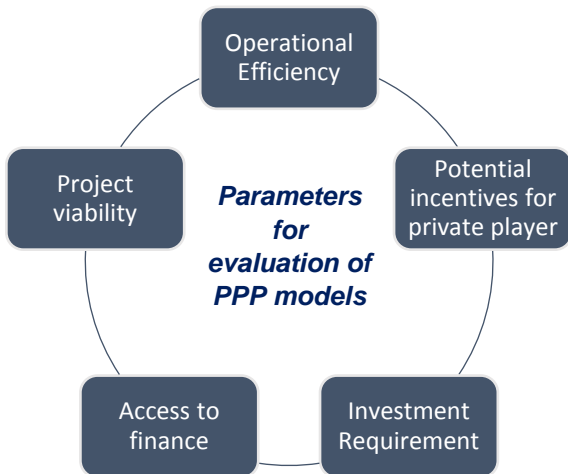


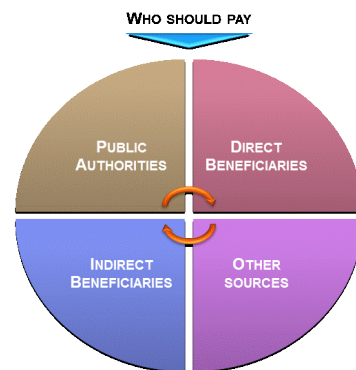
Exhibit 4: Evaluation parameters for proposed PPP models



It emerges that the suitability of PPP models would depend on several factors such as the authority’s financial strength, the city-specific context, maturity of private players in the sector and the level of control that the authority wishes to maintain in the system. While no single model can be judged as the most appropriate model, the city needs to weight the pros and cons of all the models and then choose the model that best suits its specific requirements.

Among the proposed PPP options for the selected five urban transport infrastructure projects, some options are commercially viable but in some cases government funding support either in the form of grant or subsidy is required to make the project viable and attract private sector investment. It has been noted that funds available with city authorities/state governments for development of various urban infrastructure projects are often inadequate to meet the project requirements. In this case generating additional revenue from direct and indirect beneficiary is quite important. City authorities/state government need to identify some possible innovative and dedicated sources of financing which can be adequate and sustainable to meet the project requirements.

Exhibit 6: Potential sources of funds



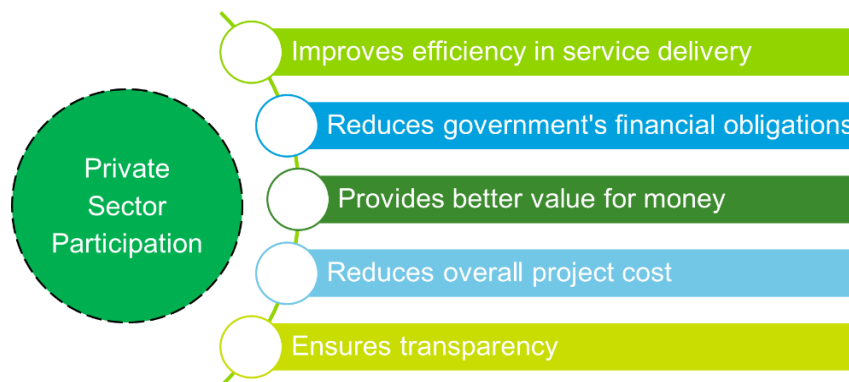
1. INTRODUCTION

1.1 BACKGROUND

Following rapid urban population growth in India during the last decade, the urban population now accounts for over 31% of total population of the country¹. This trend is expected to continue and by 2031, almost 40% of Indian population is expected to be living in urban areas². However, most Indian cities are ill equipped to provide mobility services to this growing population. This has resulted in increased use of personal vehicles leading to increased road congestion, falling journey speed, higher air and noise pollution and reduced road safety.

The government is cognizant of this fact and has identified inadequate transport infrastructure as a major reason why cities are unable to meet the increasing demands. In order to alleviate this concern, investment needs of INR 388,308 crore have been identified for urban transport infrastructure in the report of the Working Group on Urban Transport for the 12th FYP. However, the government is constrained to meet this investment need and is looking at private sector as a key source for financing urban transport infrastructure. The government estimates that close to 35% of total investment will come from the private sector.

Exhibit 7: Benefits of PPP



An approach to leverage the financial and technical expertise of the private sector is PPP. The main characteristics of a PPP model of public infrastructure and service delivery are:

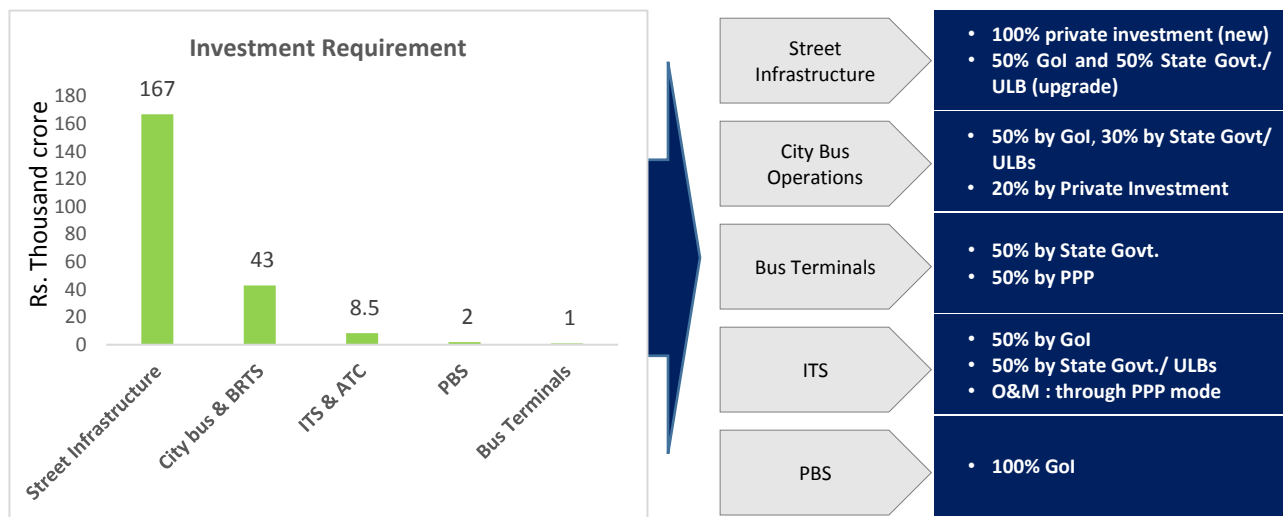
- the cooperative partnership between public institutions and the private sector to deliver public infrastructure projects and/or services,
- sharing of certain project risks between authority and the private sector on the basis of risk managing capacity, focus on project outputs rather than project inputs, and
- introduction of private financing.

Some of the benefits of undertaking a project on PPP are described in the adjoining exhibit. Indian experience in PPP in urban transport infrastructure has seen limited success so far.

¹ <http://smartcities.gov.in/writereaddata/smartcityguidelines.pdf>

² *New Climate Economy Report, 2015*

Exhibit 8: Investment required in identified projects and funding sources



Source: Report of the Working Group on Urban Transport for 12th FYP

The limited success reflects the need to drastically enhance the involvement of private sector to meet the investment needs highlighted in 12th FYP³. In the plan, the government has envisaged INR 3,88,308 crore investment urban transport projects and is looking at INR 1,35,560 crore investment from the private sector. The investment requirement for the projects identified for the purpose of this study is shown in the adjoining exhibit. Private sector involvement through PPP for Operation and Maintenance (O&M) is envisioned for city bus service and PBS with PPP for development envisioned for bus terminal. Street infrastructure in new areas is also envisioned to be on 100% private sector financing with existing infrastructure upgrade to be done through government finance.

This report is an effort towards identifying key barriers to the success of PPP in urban transport infrastructure space particularly in bus terminals, public bicycle sharing, city bus private operations, ITS and street infrastructure, as well as providing recommendations and developing PPP models.

1.2 OBJECTIVE OF THE PROJECT

The report aims to explore potential PPP initiatives in urban transport with an emphasis on promoting sustainable urban modes like motorized and non-motorized modes of transport. It aims to identify the key institutional, policy, planning, contractual and implementation barriers that need to be addressed for effective implementation of PPP initiatives. The scope of work as mentioned in the ToR is reiterated below:

1. Map the key urban infrastructure projects like bus rapid transport (BRT), PBS, bus terminals and depots etc. and identify five projects with highest potential to attract private investments in the form of PPP.
2. Present these opportunities to potential private partners and investors like banks etc. to understand the key enablers needed to attract their involvement.
3. Review the existing policy and institutional frameworks for PPP in urban transport infrastructure projects and identify the role of ongoing initiatives like city credit worthiness

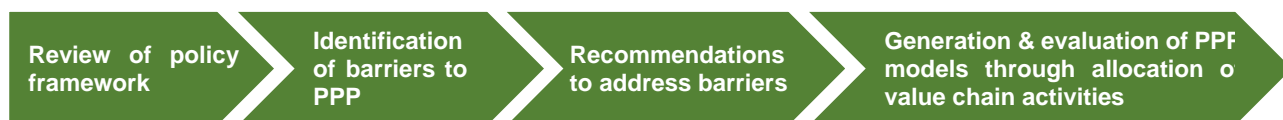
³ http://planningcommission.gov.in/aboutus/committee/wrkgrp12/hud/wg_%20urban%20Transport.pdf

assessments etc. This analysis will be conducted in two states/cities for all the five projects identified in Activity I.

4. Based on policy review and investor feedback, identify the key barriers to be addressed for effective PPP arrangements and propose recommendations to address these barriers for projects identified in Activity I.
5. For the various infrastructure projects identified, develop model action plans that the cities can use to get into various forms of PPP arrangements.

1.3 METHODOLOGY ADOPTED

Traditionally, PPP analysis is carried out merely from a financial perspective, but policy and planning barriers often hamper successful implementation of PPP projects. Therefore, the current project aims to analyse PPP in urban transport infrastructure in an integrated manner and ensure that the identified barriers and proposed recommendations cover all aspects holistically. In order to achieve the objectives of the project, a holistic and analytical approach has been adopted. This is depicted in the adjoining exhibit and is explained below.



First, a review of the PPP policy framework in India has been conducted, with emphasis on analyzing policies and regulatory framework which affect urban infrastructure PPPs in particular. Analysis of national as well as state/ city level reforms has enabled a sound understanding of the existing PPP policy framework in the country. As a subsequent step, potential PPP models have been developed for the five selected sectors - city bus operations, bus terminal, PBS scheme, street infrastructure and ITS. These models have been deliberated upon with key stakeholders from both the public and private sector.

For each identified sector, a background has been provided, followed by the current state of private participation in the sector in India. Interactions with relevant stakeholders including public authorities, private operators and financiers have been conducted to understand and capture the key barriers to PPP in the identified sectors. This is followed by action-oriented recommendations to overcome identified barriers and enable successful PPP implementation. For each sector, all activities in the value chain of the projects have been captured. Finally, based on allocation of responsibilities between private sector and public authority, PPP models have been developed through which private sector participation can be leveraged. The project feasibility under each of the proposed models has been assessed, and pros and cons of the proposed models have also been highlighted. The proposed models have then been evaluated on several parameters such as financial feasibility, monitoring effort by the authority, operational efficiency and incentives for private operators. Through the course of development of this report, inputs have been sought from relevant stakeholders such as ULBs, private operators and financiers (list of stakeholders met is provided in Annexure - I). This primary research has been supported by research and analysis of publically available literature, particularly for review of international case studies which rely heavily on secondary research. Through this all-inclusive approach, the scope for PPP in identified urban infrastructure sectors is analysed and models to involve private participation have been developed.

1.4 STRUCTURE OF THE REPORT

The report is structured in the following manner:

Chapter 2 reviews existing policies at the national and state levels from an urban transport perspective. The review looks at the policies from institutional, planning, contractual and implementation perspective.

Chapter 3 cover the **street infrastructure** projects, including barriers to private participation and suggestions for overcoming the barriers. It offers models for implementing such projects through PPP mode.

Chapter 4 identifies the key barriers for effective PPP arrangement in **PBS scheme**, explores action-oriented solutions for the identified barriers, and proposes models for private sector participation.

Chapter 5 focuses on **ITS**, covering barriers of private participation in ITS so far, and provides recommendations for creating a lucrative environment for private-sector participation. It also provides business models for carrying out ITS projects through PPP mode.

Chapter 6 identifies the key barriers for effective PPP arrangements in **city bus operations**. It provides recommendations to address the identified barriers and proposes models for private participation in city bus operation.

Chapter 7 identifies the key barriers for effective PPP arrangements in **bus terminal development and operation**, and provides recommendations to tackle such barriers. It also provides models for PPP in bus terminal development and operation.

Chapter 8 identifies some of the **possible innovative** and **dedicated sources of financing** which can be used to supplement the existing resources of the city authorities/state government to meet the project requirements and attract private sector investment.

2. REVIEW OF POLICY FRAMEWORK

This chapter analyses the main Indian policies and regulations which affect PPP projects in general and urban transport PPPs in particular. The analysis of policy framework encompasses both national level policies such as the NUTP as well as state level policies. The section below highlights the key features and barriers that exist with current policies.

2.1 NATIONAL-LEVEL POLICY REVIEW

This section aims to evaluate national level policies from an urban transport perspective. It analyses the impact of such policies on institutional, planning, contractual and implementation aspects of urban transport projects. This national policy review has been conducted with a focus on urban transport PPPs and its related provisions. These include areas such as urban transport infrastructure, private sector financing and PPPs in the field of urban transport.

2.1.1 BACKGROUND & COVERAGE

The national level policies, guidelines and missions that have been reviewed for the purpose of this report are captured in the adjoining exhibit and are highlighted below.

➤ *National Urban Transport Policy (NUTP), 2006*

The NUTP released by the Ministry of Urban Development (MoUD), GoI, envisages to ensure safe, affordable, quick, comfortable, reliable and sustainable access for the growing number of city residents to jobs, education, recreation and such other needs within cities in India. The policy outlines several measures in order to meet its stated objectives. These include providing higher priority to the use of public transport as well as non-motorized transport. The government has also decided to offer support for areas which help improve the quality of urban transport. This includes improved bus stations and terminals, improved passenger information systems, use of intelligent transport systems etc. The NUTP also recommends greater involvement of private sector in schemes such as operation and maintenance of parking facilities, certification facilities, repair facilities, construction and management of terminal facilities, etc. The NUTP also recommends encouraging State Governments to involve private sector in providing public transport services, but under well-structured procurement contracts.

The NUTP acknowledges the fact that there are non-motorized commuter groups with mobility and safety concerns which need to be addressed by encouraging construction of segregated rights of way for bicycles. Since all new City Mobility Plans are required to comply with the NUTP guidelines with a focus on “equitable allocation of road space” and an emphasis on non-motorized transport, cycle inclusive planning has gained importance. The detailed policy is publicly available for easy access⁴.

Exhibit 9: National level policies, missions and guidelines reviewed



⁴ <http://www.urbantransport.kar.gov.in/National%20Urban%20TransportPolicy.pdf>

➤ **National Transport Development Policy Committee (NTDPC)**

The working group on urban transport set up by NTDPC was required to determine the role of urban transport in meeting transport requirements of the economy over the next two decades and to develop a rolling program for 2030 in consonance with the NUTP. The NTDPC suggests a number of policy and planning interventions to improve the state of urban transport in India. Details on NTDPC's approach to transport policy can be accessed at the Planning Commission website⁵.

➤ **Smart Cities Mission– Government of India**

The Smart Cities Mission was launched by the GoI in June 2015. In the area of urban mobility, the Smart Cities Mission focuses on three main issues:

- Smart parking
- Intelligent traffic management
- Integrated multi-modal transport

In addition, the Smart Cities Mission focuses on promoting a variety of transport options – Transit Oriented Development (TOD), public transport and last mile para-transport connectivity. The mission aims to cover 100 cities over 5 years (from FY16 to FY20). The Central Government aims to provide financial support to the tune of INR 48,000 crore for a period of 5 years, i.e. on an average, INR 100 crore per city per year⁶. Implementation of the mission at the city level will be undertaken by a Special Purpose Vehicle (SPV) created for the purpose. Details on the Smart Cities Mission may be accessed at the Smart Cities Mission website⁷.

➤ **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)**

AMRUT is a recent initiative by the MoUD, GoI to provide basic services to households and build amenities in cities. This scheme covers various aspects of urban infrastructure including sewerage, water supply and urban transport. Cities have access to AMRUT funding in addition to, and sometimes in convergence with the funding under Smart Cities Mission. Details of the scheme may be accessed at the mission's website⁸.

➤ **Guidelines for Formulation, Appraisal and Approval of Central Sector Public Private Partnership Projects**

The PPP Cell under the Department of Economic Affairs, GoI has also issued guidelines⁹ for central sector PPP projects. These guidelines vary on the basis of the estimated budget for the project and have been reviewed for the purpose of this report.

➤ **Scheme and Guidelines for Financial Support to Public Private Partnerships in Infrastructure**

The PPP Cell has also released guidelines¹⁰ related to providing financial support for PPPs in infrastructure. The scheme identifies sectors where Viability Gap Funding (VGF) may be required. This scheme specifically covers urban transport PPPs as well.

⁵ http://planningcommission.nic.in/reports/genrep/present_ntdpc2802.pdf

⁶ Government of India, "Smart Cities Mission: A step towards Smart India" Retrieved from <https://india.gov.in/spotlight/smart-cities-mission-step-towards-smart-india>

⁷ <http://smartcities.gov.in/>

⁸ <http://amrut.gov.in/>

⁹ http://pppinindia.com/pdf/guidelines_approval_central_sector_ppp_projects_english.pdf

¹⁰ http://www.pppinindia.com/pdf/scheme_Guidelines_Financial_Support_PPP_Infrastructure-english.pdf

2.1.2 ANALYSIS OF POLICIES REVIEWED

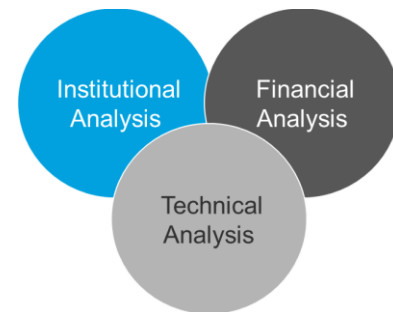
The policies that have been reviewed have been analysed from the institutional, financial and technical perspectives to understand their impact on the five urban transport projects that are chosen for the purpose of this study.

2.1.3 INSTITUTIONAL ANALYSIS

National level policies in India broadly cover the institutional aspect of urban transport. At an institutional level, national level policies contain the following provisions:

- The NUTP has specific provisions for determining the institutional structure of high capacity urban transport systems. The NUTP recommends that such systems be implemented by setting up an SPV.
- The NUTP recommends setting up of Unified Metropolitan Transport Authorities (UMTAs) in all million plus cities to facilitate effective, efficient and well-coordinated planning and implementation of urban transport systems. The UMTA is expected to prepare a strategic mobility plan for every city where it is formed. The NUTP also envisages setting up of umbrella bodies to regulate the overall performance of public transport system to ensure provision of a comprehensive public transport system for the city.
- For demand planning, the NUTP also encourages setting up of professional bodies having capacity to make scientific assessment of demand.
- The NTDP outlines a number of proposals for improving urban transport planning. The NTDP has specific provisions for comprehensive mobility planning which aims to provide a vision and direction on how urban transport in a city should grow. This planning aims at improving accessibility to modes of transport, mobility and traffic flow in that order. Some of the specific measures introduced are -
 - i. **Integrated Land Use Transport Planning** – Integrated land use transport planning needs to be taken into account to minimize transport demand.
 - ii. **Transport Demand Management** - Following limitations and boundaries of the augmentation of services and infrastructure in a city, there is a need to control the growth in transport demand. Hence, a transport demand management program should be an essential part of planning.
 - iii. **Transit Oriented Development** – Transit oriented development is a congregation of housing, jobs, shops, and other activities around mass transit stations/ corridors.
- As brought out in earlier discussions, the PPP Cell under the DoEF, Ministry of Finance (MoF), GoI has prepared guidelines for central sector PPP projects. These guidelines inter alia, cover the institutional structuring for central sector PPP projects, identification of projects, formulation of applicable project documents and guidelines for approval of relevant projects. However, these guidelines are generic in nature and are applicable for all central sector PPP projects. While model concession agreements have been drafted issued for roads, ports and power sectors, model concession agreements for urban transport are still evolving.

Exhibit 10: Dimensions of policy analysis



A detailed review of the policies reveals the following barriers at the institutional level:

- **Coordination between central and state level institutions:** The Government of India (Allocation of Business) Rules, 1961, entrusted the responsibility for planning and coordination of urban transport systems to the MoUD. At the state level, State Transport Department and Urban Development Department are the two main departments dealing with urban transport and land use. Unfortunately, there is a lack of horizontal and vertical coordination among the agencies at central, state and local levels, making accountability very difficult. In addition, the current systems of laws, regulations and governance for urban transport have not evolved to address specific issues in urban transport resulting in fragmentation or overlap of jurisdictions. There is also lack of an effective coordination whereby urban transport and land use plans can be formulated and integrated keeping an overall goal in mind. This results in a lack of focus on innovative techniques in solving urban transport problems, as well as conflicting guidelines for the implementation of PPPs in the country. This makes adequate planning and implementation of PPPs difficult.
- **Lack of comprehensive legislation:** There is no single legislation at the central, state or local level that comprehensively covers urban transport requirements of Indian cities.

2.1.4 FINANCIAL ANALYSIS

Ensuring adequate financing for PPPs has been a thrust area for the central government for a long time. While financing for PPP projects has been a focus of a number of policies, financing for urban transport projects has not received sufficient attention. However, some of the policies which are related to urban transport for NUTP have been highlighted herein.

- For urban transport, the NUTP has recommended that the Central Government should:
 - i. provide 50% of the cost of preparing comprehensive city transport plans and detailed project reports;
 - ii. offer financial support either in the form of equity or one time VGF, subject to a ceiling of 20% of the capital cost of the project; and
 - iii. offer 50% of the cost of project development whenever such projects are sought to be taken up through public-private partnerships, so that a sound basis for attracting private partners can be established. The remaining cost of such project development would have to come from the city development authority/ State Government and a project developer.

The NUTP also envisages setting up of dedicated Urban Transport Funds (UTFs) at the city level for all million plus cities and a state level UTF for the remaining urban areas. The NUTP mentions some of the potential revenue sources for such UTFs, which include a supplement to the petrol and diesel taxes, a betterment levy on land owners, and tax on employers.

- In addition, the funding pattern for projects under AMRUT¹¹ is as follows:
 - i. One-third of the project cost as grant from GoI for cities with a population of above 10 lakh.
 - ii. One-half of the project cost as grant for cities/towns with population up to 10 lakh.

¹¹ Government of India, "Mission Statement & Guidelines, Atal Mission for Rejuvenation and Urban Transformation (AMRUT)" Retrieved from: <http://amrut.gov.in/writereaddata/AMRUT%20Guidelines%20.pdf>

- iii. Balance funding by State Governments/ Urban Local Bodies (ULBs) or through private investment.
- iv. The tender will include O&M for five years based on user charges. For the purpose of calculation of the project cost, the O&M cost will be excluded; however, the States/ULBs will fund the O&M through an appropriate cost recovery mechanism in order to make them self-reliant and cost-effective.

The financial share of cities is envisaged to vary across states. In some states, the ULBs may be in a position to contribute significantly to the project cost as compared to a ULB in the same or another state. Accordingly, states have to decide during formulation of the State Annual Action Plan (SAAP) on how the residual financing (over and above Central Government share) is shared between the State, ULBs and any other source identified by the State/ULB. However, the state contribution to the SAAP will not be less than 20 percent of the total project cost.

- The GoI has allocated INR 50,000 crore for the AMRUT scheme and INR 48,000 crore for the Smart Cities Mission¹².
- The PPP Cell's guidelines on providing financial support for PPPs in infrastructure identifies sectors where VGF may be required. It has identified urban transport as one of the sectors where there is a need for VGF. The Scheme provides financial support in the form of grants, one time or deferred, to infrastructure projects undertaken through public private partnerships with a view to make them commercially viable. The Scheme provides total VGF up to 20 percent of the total project cost. The guidelines cover the institutional structure for the VGF, the appraisal process and the in-principle approval by empowered institutions, the guidelines for disbursement of the VGF as well as monitoring of the funding process.

An analysis of the schemes and policies with respect to financing of urban transport infrastructure reveals that while the government provides options for VGF for PPP projects, urban transport projects are often not prioritized under these schemes. This is mainly because urban transport PPPs such as bus services are often service based contracts with low capital investment, while VGF is mostly provided to projects with high capital expenditure. This results in a lack of funding and support for urban transport PPPs.

Another challenge from the financial perspective is that even after nearly 10 years since the NUTP was published, establishment of UTFs has not progressed as expected. Although various states have taken initiatives to set up UTFs in line with NUTP recommendations, the expectations from these UTFs have not been fulfilled. Most of these UTFs are in the evolving phase and substantial improvements in their structure are required. A general absence of clarity on how a UTF could be set up, what could be the suitable funding sources, who would manage it and where it could be positioned etc. is observed to be responsible for deferring the setting up UTFs. Also, in some cases, prioritization for utilization of UTF is not specified to ensure efficient utilization of the limited funds.

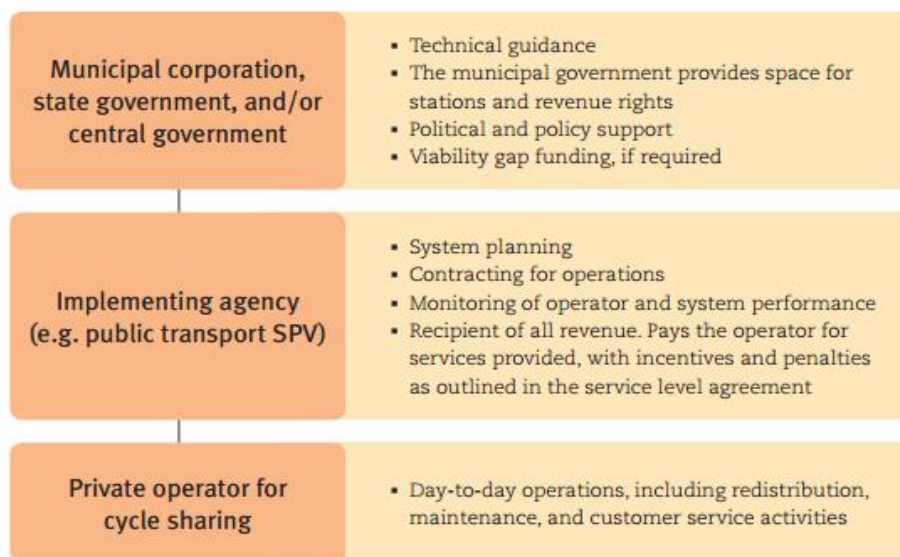
2.1.5 TECHNICAL ANALYSIS

¹² <http://amrut.gov.in/writereaddata/AMRUT%20Guidelines%20.pdf>
<http://smartcities.gov.in/writereaddata/smartcityguidelines.pdf>

Analysis of policies from a technical standpoint indicates that while there are a number of policies which cover technical aspects of urban transport, there is a lack of coherence among different policies. An analysis of policies from a technical standpoint is undertaken here:

- For promotion of Non-Motorized Transport (NMT), the NUTP states that the Central Government would give priority to the construction of cycle tracks and pedestrian paths in all cities to enhance safety and thereby enhance use of non-motorized modes. Cities would also be encouraged to explore the possibility of a public bicycle program, where people can rent a bicycle for use in specially designated areas. The NUTP also envisages taking up of pilot projects, in a sample set of cities, to demonstrate improvements that are possible through enhanced use of cycling, for possible replication in other cities.
- The NTDPDC also suggests a number of technical interventions to ensure a sustainable modal mix. These are:
 - i. **Walking and NMT** – Planning interventions to improve these include improvement in bike lanes etc. In line with the shortlisted projects for Shakti Foundation, NTDPDC envisions at least one cycle sharing system with $\geq 5,000$ cycles and automated payment in cities with a population of over 5 lakhs (benchmark census year 2011). Ridership of the system should be in excess of 1000 trips per bicycle per year;
 - ii. **Public transport modes** - NTPDC looks at three primary areas - Mass Rapid Transit (MRT), Intermediate Public Transport (IPT) and personalized public transport.
 - iii. **Multimodal integrated and city wide public transport network** – NTPDC also aims to provide a city-wide public transport network which enables a commuter to complete his entire journey using public transport.

Exhibit 11: Roles of various public authorities



The major barrier from the technical aspect is the unavailability of technical guidelines. There is a lack of comprehensive policy for technical specifications for a number of urban transport PPPs.

While there are technical guidelines for certain schemes such as the public bike sharing scheme, most urban transport projects lack a coherent set of guidelines.

3. STREET INFRASTRUCTURE

A street infrastructure project typically includes footpaths and pavements, landscaping, and street furniture. In addition, depending upon the business model of the project, it may also include bus shelters/stops, on-street parking, space for street vendors, charging points for electric vehicles, and space for public bike sharing scheme. Street infrastructure is fast gaining importance in the development of Indian cities, since it is one of the most prominent aspects with respect to the visual appeal of a city. Several cities as part of their smart city proposals have included development of footpaths and street landscape on corridors. It is estimated that India will require 70,991 km of new and upgraded street infrastructure by 2017¹³. One of the goals identified in the 12th Five Year Plan is to create facilities for walking and cycling in all cities and state capitals with a population of over 2 lacs, since these are non-polluting modes that do not use fossil fuels and provide social equity. The estimated investment to develop the street network, both new and for upgrading the existing network, as well including pedestrian and bicycle facilities is INR 1,67,218 crores. The component wise split of the fund requirement for street infrastructure is represented in the adjoining exhibit.

Smart City Proposals

Jaipur – street landscape on corridors

Udaipur - construction and maintenance of footpath

Vishakhapatnam – footpath improvement

Exhibit 12: Component wise investment requirement in street infrastructure (12th FYP)

Component	Investment (INR cr)
Street Network – New Areas	1,01,159
Pedestrian, NMV, Streetscaping	15,174
Roads	85,985
Street Network - Upgradation	66,059
Pedestrian, NMV, Streetscaping	27,335
Roads	38,724
TOTAL STREET INFRASTRUCTURE	1,67,218

As per the recommendations of the Working Group on Urban Transport for the 12th FYP, resources required for development of streets in new areas are to be raised through development charges, betterment levy and such other mechanisms. However, upgradation/improvement of existing street network will require support from government as raising of resources linked to development is difficult. For promoting bicycles and developing walking facilities, a new scheme is proposed. As per these recommendations, the infrastructure cost for these would be borne by the Government while the operation and maintenance is envisaged to be on PPP.

Given the huge requirements of street infrastructure projects and weak financial capacity of most ULBs in India, private participation plays a crucial role in development of street infrastructure. In this chapter, initiatives by government in the area of street infrastructure has been discussed. Further the key barriers for effective implementation of PPP projects under

¹³ http://planningcommission.gov.in/aboutus/committee/wrkgrp12/hud/wg_%20urban%20Transport.pdf

planning, institution, contractual arrangement, and project implementation have been highlighted, while suggesting an action plan to address the identified barriers.

3.1 PUBLIC PRIVATE PARTNERSHIP IN STREET INFRASTRUCTURE

Many ULBs do not have financial capacity to develop street infrastructure, hence there is need to explore alternative sources of investment. When the risk between public authority and private sector can be appropriately divided, then PPP models can be explored. Though there is no precedent for a PPP project exclusively in street infrastructure in India, it is possible to take up the project on PPP basis. In some cases, development of street infrastructure has been part of a larger project such as development of BRTS corridor or tram network. As discussed above, a street infrastructure project essentially involves footpaths and pavements, landscaping, and street furniture. Depending upon the Right-of-Way (RoW) in specific case and to make the project commercially viable, the project may include one or more of the following components: bus stations/stops, on-street parking, space for street vendors, charging points for electric vehicles, and space for public bike sharing scheme. The source of revenue from the project may include revenue from advertisement on bus stations, parking fee, rental from street vendors, and user fee from bicycle rentals. In the context of street infrastructure development, private player usually refers to a private outdoor advertising company or a private builder (in case of street landscaping).

NDMC contract with JCDecaux

Contract with JCDecaux Advertising India Private Limited for construction, operation and maintenance of Bus-Q-shelters in New Delhi Municipal Corporation Area (2005): Under this contract, NDMC provided the basic design of the bus shelters, also specifying the locations for construction of the bus shelters. The private outdoor advertising agency was responsible for construction of the bus shelters and operation and maintenance during the concession period. Revenues, primarily accruing from advertisements, were retained by the private player, and bus shelters are to be transferred to NDMC at the end of the concession period. The private operator was required to share a portion of revenues with NDMC, in the form of an annual concession fee.

Source: Deloitte's primary research

West Lafayette Street Redevelopment Project

In 2016, the city of West Lafayette in Indiana selected a private developer, Plenary Group, for its street redevelopment project with a 25 year contract period. The scope of work includes reconstruction of streets and roundabouts, installation of street lights upgradation of pedestrian facilities and existing signals. The street furniture consists of benches of various types, street trees, waste and recycling receptacles, bicycle racks, bollards, public art etc. The project is on a BOT model, under which the private developer will build, operate and maintain the street landscape for 25 years, and then transfer ownership to the city. A total investment of USD 120 million is proposed by the city of West Lafayette and Purdue University to cover the costs of designing, building, operating and maintaining the project. The private developer is proposed to invest USD 65 million into the project and would be paid the pre-decided amount in availability payments using revenue from an already-designated tax increment financing district.

Source: http://www.fhwa.dot.gov/ipd/project_profiles/in_state_street.aspx

Chicago's street furniture contract with JCDecaux

In 2001, the city of Chicago signed a 20 year city-wide contract with outdoor advertising agency JCDecaux for construction and operation of 2000 bus shelters as well as newsstands, information kiosks as well as other street furniture structures. Revenues on account of advertisements are retained by the private player. The city receives an annual instalments of USD 20 million as revenue share from the private player, over the 20-year period.

Source: <http://www.jcdecaux.com/en/Newsroom/Press-Releases/2001/JCDecaux-wins-City-of-Chicago-street-furniture-contract-strengthening-us-position>

3.2 KEY BARRIERS

In India, street infrastructure projects have been implemented on PPP basis only on a small scale till now. However, some major barriers to private participation have emerged and need to be addressed if PPP in street infrastructure is to be made successful. These barriers have been highlighted in the section below.

3.2.1 POLICY AND INSTITUTIONAL

- Mismatch between national policy intent and city level implementation:** National level policies such as the NUTP broadly touch upon the aspect of bringing about a more equitable allocation of road space with movement of people, rather than vehicles, as its main focus. The Indian Roads Congress has published guidelines for pedestrian facilities, and highlights that developing pedestrian environment on streets means more than laying down a footpath or installing a signal. It also emphasizes that pedestrian facilities should be planned in an integrated manner and provides details on design parameters for footpaths. However, translation of policy focus into implementation of specific street infrastructure components is weak. Similarly, the Master Plan of Delhi 2021 specifies that all roads should be made pedestrian, disabled and bicycle friendly and it focusses on provision of adequate pedestrian facilities and removal of encroachments from sidewalks. However, detailed action plan for implementation of pedestrian friendly street infrastructure does not find coverage.
- Institutional fragmentation:** The institutional arrangement for provision and maintenance of street infrastructure is highly fragmented and roles and responsibilities of the concerned agencies are loosely defined. Multiple government bodies are involved in the provision of street infrastructure, primary among them being Municipal Corporations and Development Authorities. The Jal Board and the Electricity Board also come into the picture, since water and electricity connections are an important backbone of street infrastructure. Street infrastructure is often developed as a part of standard road infrastructure component and as such, Public Works Department is also involved. This multiplicity of organizations makes the PPP contract difficult to administer as the agency responsible for contract signing as well performance monitoring is not clear. While advertising spots within a city are usually owned by the Municipal Corporations, in many cases, other ULBs also own some advertising spots. In the case of Delhi, for example, as many as 11 agencies have invited advertising tenders. This also creates ambiguity regarding the advertisement potential that can be tapped to finance street infrastructure, and invites apprehension of the private players. Given the multiplicity of authorities, it becomes difficult for a private operator to coordinate with all such concerned authorities, since clearances need to be obtained from several agencies.
- Absence of documented policies with respect to outdoor advertising (major source of revenue for street infrastructure projects):** Advertisements are a major source of

revenue for funding street infrastructure development. In many international cities, advertising companies develop the entire city street furniture in lieu of advertisement rights. In most Indian cities, there are no documented policies with respect to outdoor advertising. For example, there is no planning regarding how much space per sq km area would be leveraged for advertising. In such a scenario, there is uncertainty about the extent to which the city desires to leverage its space for hoardings or other advertising spots, and there is often no documented inventory of advertising spots in a city. Private outdoor advertising agencies, thus, have no certainty of the city's outdoor advertising potential and are always under the threat of additional advertising spots being added, thus reducing their revenue potential. This leads to discomfort on the part of the private operator(s) from entering into street infrastructure projects and assuming revenue risks. Formerly, the JNNURM funding was tied to a list of reforms which included an advertisement policy at the city level which taps advertisement revenue on public transport, intermediate public transport and public utilities. However, this has not been implemented in most cities.

3.2.2 PLANNING AND DESIGN

- **Priority to road surface:** The investment in the road sector is more focused on the black top for smooth flow of traffic with street infrastructure not being given much priority. This is evident from case of the Bangalore Metropolitan Region where the Comprehensive Traffic and Transportation Studies (CTTS) envisions just INR 70 crore investment for improvement and augmentation of street infrastructure out of a total investment of about INR 47,000 crore in the road sector. This allocation is insufficient for the street infrastructure needs of the city.

3.2.3 CONTRACTUAL ARRANGEMENT

- **Lack of comprehensive contractual framework:** PPP in street infrastructure is a nascent concept in India. Unlike other sectors such as ports, roads and highways, there are no model contract documents in place for execution of street infrastructure projects on PPP basis. In such a scenario, contracts tend to lack comprehensiveness and based on discussions with stakeholders, it emerges that the spirit of "partnership" is often missing in the contract provisions. Contract provisions often lack clauses on the change of scope, and considering the length of the contract period (usually around 20 years), this makes the contract too rigid. Additionally, there is no provision for termination payments, and private players face a major risk in case of premature termination, rendering their capital investments unrecoverable. This leads to discomfort on the part of private players and bankers, who are then hesitant of entering into PPP arrangements for such projects.
- **Lack of exclusivity of advertising rights:** Private outdoor advertising agencies investing huge amounts in the construction and maintenance of street infrastructure opine that giving out advertising inventory in a city to multiple operators fetches lower advertising rates due to competition among the advertisers, and thus makes it difficult for any operator to recover the costs. Most European countries such as France, Germany and Denmark, follow the city-wide contract approach, wherein, a private outdoor advertising agency is given a city-wide contract for development of street infrastructure in lieu of exclusive advertising rights, which makes the project self – sustaining in nature. In the Indian case, however, the "one city – one partner" approach is not prevalent. Within a single city, different advertising spots are given to different operators, thus reducing their bargaining power and resulting in lower advertisement revenue. Adopting the globally successful model of "one city – one partner" would incentivize private operators to venture into street infrastructure projects. Exclusive

advertising rights across a city would enable them to exploit advertisement potential to the maximum. In case of a very large city like Delhi, zone-wide contracts could be implemented while in smaller cities, city-wide contracts would be better.

3.2.4 PROJECT IMPLEMENTATION

- **Lack of revenue safeguards:** Often, there is no cushion provided to the private operators against unforeseen revenue losses. For example, temporary closure of some bus stops on account of metro rail construction work could result in significant advertisement revenue losses. Hawkers often encroach spaces in front of advertising spots or trees cover certain billboards/ hoardings, thus resulting in no takers for such spots. Huge revenue risks are thus borne by the private operators, and the concept of risk sharing between the public and private parties is lacking. Unforeseen policy changes such as closure of certain advertisement spots also acts as a threat to the revenue potential of the private operators, with no safety net provision.
- **Lack of safety net against vandalism of street furniture:** In many Indian cities such as Delhi and Udaipur, street furniture is prone to theft and vandalism, in the absence of robust round-the-clock monitoring. There have been instances where bus shelter seats have been stolen and need to be replaced by the private operator at its own costs. There are no safeguards provided to the operator against such eventualities which result in significant losses to the operator.
- **Aggressive revenue estimation:** Advertising is the main source of revenue for street infrastructure projects. In projects where advertisement is the prime source of revenue, at times, revenue estimation is aggressive that causes project implementation issues and jeopardizes the feasibility of the project. In certain cities, supply of advertisement spots is huge, while there are not many takers, leading to a fall in advertisement rates. Moreover, the occupancy of advertisement spots is seasonal, varying from as low as 30% during lean periods to as high as 80% during peak seasons. Hence, the perception that advertisement always fetches high revenue is not entirely true. This threatens the revenue potential estimates of the private player and invites their apprehension.
- **Legal hurdles:** Advertisement is the main source of revenue for several components of the project. However the potential of revenue generation may be limited as courts have restricted the number of advertisements that may be placed along the streets on grounds of safety. This limits the commercial viability of the project and hence becomes difficult to attract private sector investment.

3.3 RECOMMENDATIONS TO ADDRESS BARRIERS

The barriers identified in the above section need to be addressed to ensure successful PPP implementation in street infrastructure projects. The key recommendations in this regard are captured in the table below.

Exhibit 13: Barriers to PPP in street infrastructure and corresponding recommendations

Barriers	Suggestive action	Action by	Time period*
POLICY & INSTITUTIONAL			
Absence of comprehensive policies and guidelines on street infrastructure	<ul style="list-style-type: none"> Documentation of policies with focus on street infrastructure projects, and related implementation guidelines 	Central Government/State Government	Medium term
Institutional fragmentation	<ul style="list-style-type: none"> Creation of UMTAs at the city level enabling a robust and unified institutional framework 	Central Government/State Government	Medium term
Absence of documented policies with respect to outdoor advertising (major source of revenue for street infrastructure projects)	<ul style="list-style-type: none"> Mandatory reform of drafting advertisement policy to be tied to release of funds under the GoI schemes 	State Government/City Authority	Medium term
PLANNING & DESIGN			
Lack of integrated approach to planning	<ul style="list-style-type: none"> Street infrastructure planning to be discussed with all relevant agencies, coordinating various aspects/ components of a street infrastructure project Providing due weightage to street infrastructure in master plan and CMP. 	City Authority	Short term
Priority to road surface	<ul style="list-style-type: none"> Greater priority to be given to street infrastructure investments in the funding schemes of the government 	State Government/City Authority	Medium term
CONTRACTUAL			
Lack of comprehensive contractual framework	<ul style="list-style-type: none"> Development of model contract documents along with guidelines 	Central Government/State Government	Short term
Lack of exclusivity of advertising rights	<ul style="list-style-type: none"> Adopting city-wide/ zone-wide approach Develop advertisement policy 	State Government/City authority	Short term
PROJECT IMPLEMENTATION			

Barriers	Suggestive action	Action by	Time period*
Aggressive revenue estimation	<ul style="list-style-type: none"> Revenue estimation based on demand and market due diligence, so that feasibility estimation of projects is realistic 	Private operator, city authority	Short term
Lack of revenue safeguards	<ul style="list-style-type: none"> Develop advertisement policy Provision of exclusive advertising rights given to a private player within infrastructure facilities developed through PPP mode 	City authority	Short term
Lack of safety nets against vandalism of street furniture	<ul style="list-style-type: none"> Develop comprehensive model contract - clauses on revenue safeguards against vandalism to be included in the contracts, and private operator to be compensated for resulting cost escalation 	City authority	Short term
Legal hurdles	<ul style="list-style-type: none"> Establish unified authority or dilution of power to concerned authority involved in development of street infrastructure 	State Government/City Authority	Medium term

*Short term: upto 1 year, Medium term: 1 to 3 years, Long term: more than 3 years

3.4 GENERATION AND EVALUATION OF PPP MODELS

The activities involved in the entire value chain of street infrastructure development have been described below. Based on the allocation of responsibility for undertaking each of these activities, three types of PPP models have been developed. These models have then been evaluated on several parameters to assess their viability and a comparative assessment has been made.

3.4.1 VALUE CHAIN ACTIVITIES IN STREET INFRASTRUCTURE DEVELOPMENT

A number of activities are involved in the development of street infrastructure. The first phase is planning and designing, which involves activities such as identification of streets for development, finalization of product mix, layout planning, estimation of costs, acquisition of necessary clearances and setting of O&M standards. The successive phase is the implementation phase, involving the broad activities of infrastructure construction, obtaining/ shifting utilities, advertising etc. This is followed by the Operation and Management of the street infrastructure which covers a host of activities for undertaking the day to day operation and maintenance of the street infrastructure. The activities involved in the value chain of bus terminal development and operation are described below. These have then been assigned to the private player or the public authority, and three PPP models have been developed.

I. PLANNING AND DESIGNING:

Identification of streets: The first activity in the planning phase is the identification of street(s) for infrastructure development on PPP basis. A number of streets may be bundled together and chosen for development on PPP basis, or a city-wide contract including all the identified streets may be entered into with the private player.

Finalization of product mix: This involves deciding the components of the street infrastructure to be developed. Street infrastructure includes basic components such as pavements, sidewalks and bus shelters, as well as street furniture such as vending kiosks, information panels, wifi spots, gantries, police booths, unipoles, benches, newsstands, wayfinding systems, public conveniences, litterbins etc. The city authority needs to decide on the specific components that would be developed on PPP basis.

Estimation of costs: The city authority needs to estimate the costs of development and maintenance of the street infrastructure. This will enable better allocation of responsibilities between the authority and the private operator, based on the financial capacity of the authority. It will also help the authority understand whether the O&M fees being quoted by the private player is reasonable or not.

Layout and design planning: Once the product mix has been finalized, the design, layout and specifications of each component need to be decided upon. For example, the dimensions of the bus shelters and unipoles, the design of kiosks, specifications of the public conveniences etc.

Acquisition of necessary clearances: A host of agencies are involved in various aspects related to street infrastructure. These include the Municipal Corporations, the water and electricity agencies etc. Accordingly, clearances would need to be procured from these agencies for the aspects that fall under their domain.

Establishment of O&M standards: The standards for operation and maintenance of the street infrastructure need to be clearly documented to enable monitoring and ensure accountability.

II. IMPLEMENTATION:

Construction of street infrastructure: This phase involves the construction of the street infrastructure components that were finalized during the planning stage. This also includes the advertising infrastructure such as hoardings/ unipoles which would be used as advertising spots for revenue generation.

Advertising: This involves the renting out of advertisement spots for generation of revenue. An outdoor advertising agency would be best placed to contact advertiser.

Obtaining/ shifting utilities: For the construction of street infrastructure, certain utilities such as street lighting may have to be shifted, while some utility connections such as electricity/ water would need to be obtained.

III. OPERATIONS AND MANAGEMENT

Maintenance of street infrastructure: Infrastructure constructed on the streets would require high level of maintenance (daily/ weekly basis), specially since it is outdoor infrastructure. The maintenance standards would be defined at the planning stage.

Monitoring of performance standards: The performance standards set forth at the planning stage would need to be monitored against actual delivery. For this purpose, the standards must be measurable, realistic and clearly defined. They must not leave scope for subjectivity, so as to ensure accountability.

Revenue collection: Revenues for street infrastructure development accrue mainly on account of advertisements on the infrastructure. The responsibility for revenue collection would need to be assigned appropriately to the public authority or the private operator, based on the model chosen.

3.4.2 PPP MODELS IN STREET INFRASTRUCTURE DEVELOPMENT

Based on the allocation of responsibilities for the various identified activities in the value chain of street infrastructure development, the following three types of PPP models have been proposed:

1. Composite BOT model
2. De-linked BOT model
3. O&M fee model

I. COMPOSITE BOT MODEL (CITY/ ZONE – WIDE)

Under this model, the Authority identifies the streets for development and finalizes the product mix. It then contracts a private player (consortium of infrastructure developer and outdoor advertising agency) to finance, construct and operate the basic street infrastructure as well as the street furniture. The private player builds and maintains the street infrastructure for the contract period, gets advertising rights on the street infrastructure along with other commercial establishments such as FM radio, wifi hotspot, newsracks, city information system, tourist information system, naming rights etc. Under this model private operator can also integrate street infrastructure with other related infrastructure such as PBS scheme, car parking etc. The Authority sets performance benchmarks and periodically monitors the private party's compliance with these standards. The street infrastructure is transferred to the Authority at the end of the concession period. The bidding parameter is the upfront system management fee (positive/negative) quoted by the private players.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under this model is provided below.

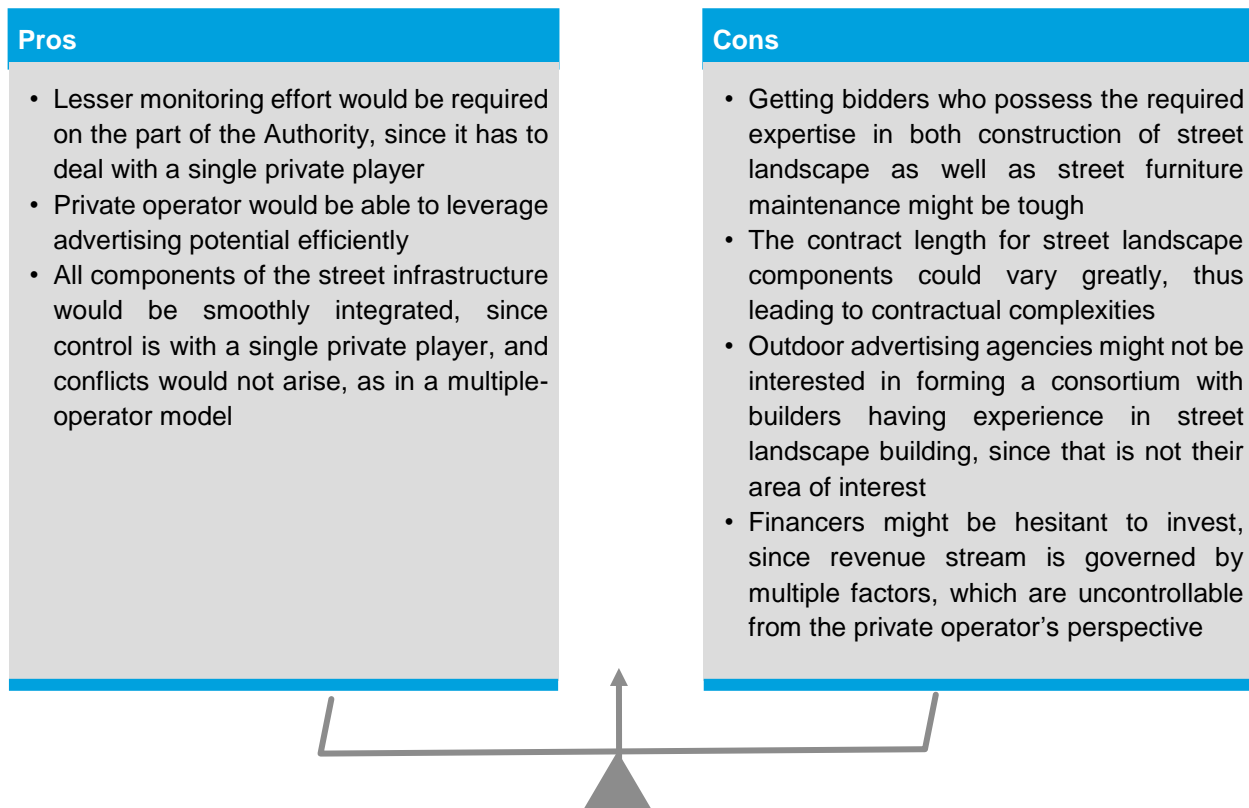
Exhibit 14: Responsibility Allocation under Composite BOT model

PHASE	PLANNING	IMPLEMENTATION	O&M
	MONITORING		
ACTIVITY	Identification of areas for street infrastructure	Ensuring land availability	Maintenance of street infrastructure
	Identification of spaces for advertising	Construction of the basic street infrastructure (pavements and footpaths)	Maintenance of street furniture
	Finalisation of design and layout for the street infrastructure	Construction of street furniture (kiosks, benches etc.)	Collection of revenues from advertising
	Acquisition of necessary clearances	Reinstallation of underground utilities if any	Monitoring of performance standards
	Identification of O&M Standards and length of Concession Period	Obtaining utility connections for the advertising (electricity)	
	Authority to identify utilities network disturbances		

Legend	AUTHORITY
	PRIVATE OPERATOR

PROS AND CONS

The pros and cons of the Composite BOT model are described below.



II. DE-LINKED BOT MODEL (CITY/ ZONE - WIDE)

Under the de-linked BOT model, the Authority identifies the streets for development and finalizes the product mix. It then contracts a private developer (P – 1) to build and operate the basic street infrastructure (under a BOT or Engineering Procurement Construction contract), including sidewalks and pavements. The developer receives a monthly system management fee for construction and maintenance of the built infrastructure.

The Authority contracts a private outdoor advertising agency (P – 2) under a separate contract to build and operate the street furniture including bus shelters, public utilities, gantries, unipoles, kiosks, FM radio, wifi hotspot, newsracks, city information system, tourist information system etc. The outdoor advertising agency builds and maintains the street furniture for the contract period in lieu of advertising rights. P – 2 also shares a certain percentage of the revenue earned through advertisements with the Authority. This revenue sharing would be in the form of an annual concession fee, with an a specified yearly escalation. The Authority sets performance benchmarks and periodically monitors the private party’s compliance with these standards.

The street infrastructure is transferred to the Authority at the end of the concession period. The bidding parameter is the upfront fee quoted by the developer (P – 1) and the amount of annual concession fee expressed as percentage of revenue earned per year payable by the outdoor advertising agency (P – 2) to the Authority.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under this model is provided below.

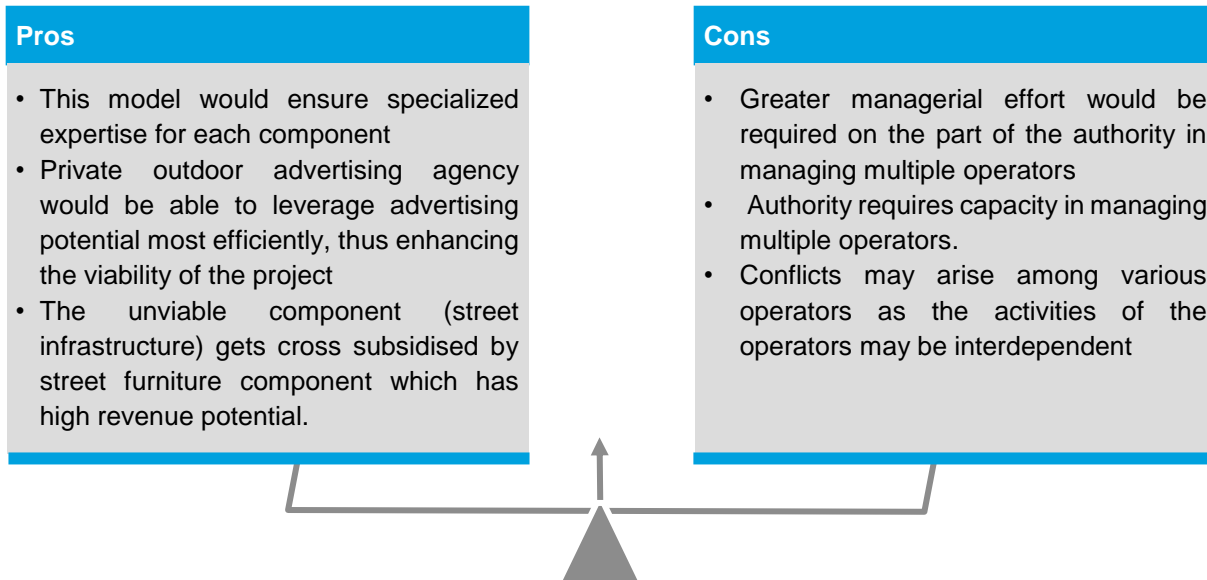
Exhibit 15: Responsibility Allocation under De-linked BOT model

PHASE	PLANNING	IMPLEMENTATION	O&M
		MONITORING	
ACTIVITY	Identification of areas for street infrastructure	Ensuring land availability	Maintenance of street infrastructure (P – 1)
	Identification of spaces for advertising	Construction of basic street infrastructure (pavements and footpaths) – P - 1	Maintenance of street furniture (P – 2)
	Finalisation of design and layout for the street infrastructure	Construction of street furniture (kiosks, benches etc.) – P - 2	Collection of revenues from advertising
	Acquisition of necessary clearances	Reinstallation of underground utilities if any	Monitoring of performance standards
	Identification of O&M Standards and length of Concession Period	Obtaining utility connections for the advertising (electricity)	
	Authority to identify utilities network disturbances		

Legend	AUTHORITY
	PRIVATE OPERATOR

PROS AND CONS

The pros and cons of the de-linked BOT model are listed below.



III. O&M FEE BASED MODEL (STREET – WISE)

Under this model, the Authority identifies the streets for development and finalizes the product mix. It hires a private operator to build and maintain the entire street infrastructure for the designated streets for the contract period. The authority pays a pre-decided monthly O&M fee to the private operator for building and maintaining the street infrastructure. The Authority retains advertising rights, while the private player receives a fixed O&M fees. The Authority sets performance benchmarks and periodically monitors the private party’s compliance with these standards. The bidding parameter is the O&M fee quoted by the private player.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under this model is provided below.

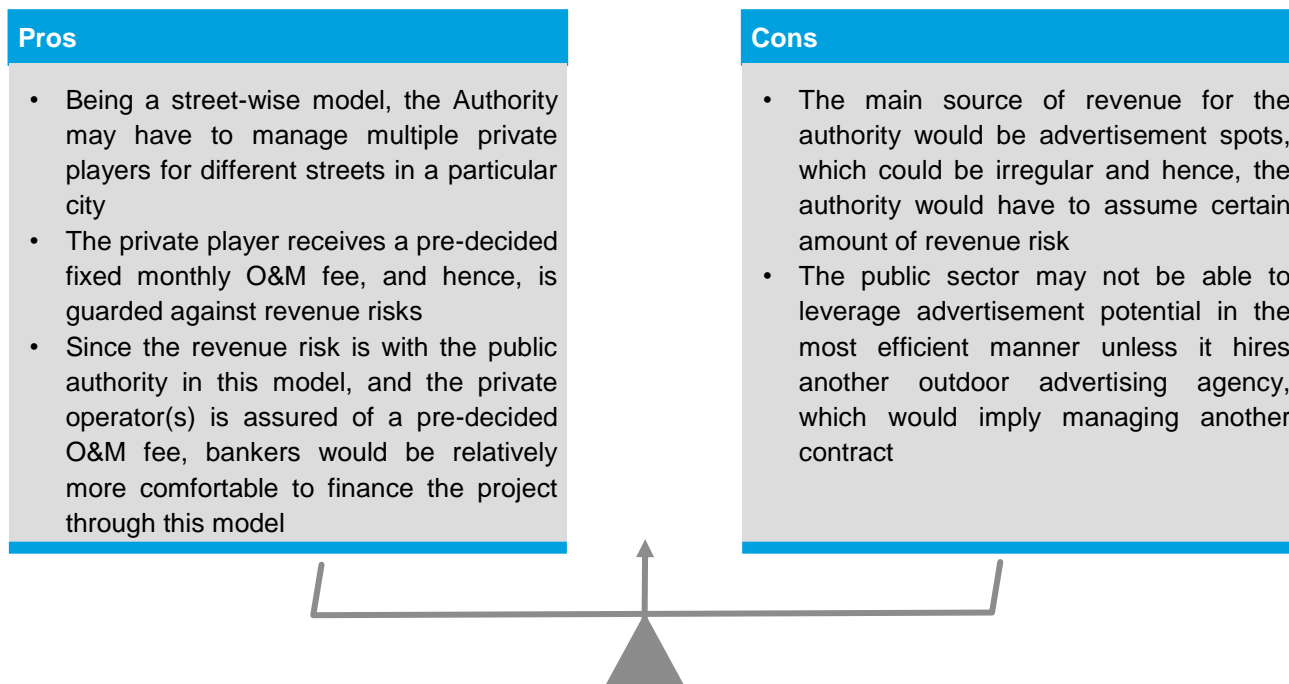
Exhibit 16: Responsibility Allocation under the O&M fee based model

PHASE	PLANNING	IMPLEMENTATION	O&M
	MONITORING		
ACTIVITY	Identification of areas for street infrastructure	Ensuring land availability	Maintenance of street infrastructure
	Identification of spaces for advertising	Construction of basic street infrastructure (pavements and footpaths)	Maintenance of street furniture
	Finalisation of design and layout for the street infrastructure	Construction of street furniture (kiosks, benches etc.)	Collection of revenues from advertising
	Acquisition of necessary clearances	Reinstallation of underground utilities if any	Monitoring of performance standards
	Identification of O&M Standards and length of Concession Period	Obtaining utility connections for the advertising (electricity)	
	Authority to identify utilities network disturbances		

<i>Legend</i>	AUTHORITY
	PRIVATE OPERATOR

PROS AND CONS

The pros and cons of the O&M fee based model are described in the adjoining diagram.



FINANCIAL ASSESSMENT

Capital cost estimates: The table below provides the capital cost estimates for development of street infrastructure of 1 km, considering development on both sides of the street.

COMPONENT/ ACTIVITY	Unit	Unit (No.)	Costs per unit (INR)	Total Cost (INR)	Remarks/ Assumptions
STREET LANDSCAPE (CIVIL COMPONENT)					
Footpath	Km	2	44,00,000	88,00,000	• Width of footpath: 2.5 m, includes costing of shifting utilities (taken as 5% of construction cost)
Cycle track	Km	2	45,00,000	90,00,000	• Width of cycle track: 2.5 m, on both sides of the road
Street Lighting	Km	1	-	1,40,14,000	• Per km street lighting cost for 150 watt metal halide light, 6 m high mounting, spaced at 20 m center to center
Storm Water Drain	Km	1	-	2,37,16,000	• Per km cost for a 900 mm diameter storm water drain
Carriageway redevelopment	Km	1	-	2,27,15,000	• Considers 6m wide, 2 lane carriageway.

COMPONENT/ ACTIVITY	Unit	Unit (No.)	Costs per unit (INR)	Total Cost (INR)	Remarks/ Assumptions
Developing telecom conduits	Km	1	-	70,65,520	<ul style="list-style-type: none"> Development of telecom conduits may be taken up to rationalize service provision along the roads when the same are disturbed due to development or integration of cycle infrastructure.
Landscaping and Miscellaneous	Km	1	-	26,98,080	<ul style="list-style-type: none"> Includes cost estimate to provide new tree plantations, shrubs, grass, planters, benches, bollards, blinkers etc., as well as provisions for any change in paving material etc.
STREET FURNITURE					
Bus shelters	No.	4	5,00,000	20,00,000	<ul style="list-style-type: none"> 2 bus shelters assumed in a stretch of 1 km, cost estimate based on primary research
Public conveniences	No.	1	10,00,000	10,00,000	<ul style="list-style-type: none"> 1 public convenience assumed in a stretch of 1 km 400 sq ft area at 2000 INR/sq ft, plus cost of fittings & utility connections
Gantries	No.	3	3,50,000	10,50,000	<ul style="list-style-type: none"> 3 gantries (size 40*8 ft) assumed in a stretch of 1 km, cost estimate based on primary research
Hoardings	No.	3	5,00,000	15,00,000	<ul style="list-style-type: none"> 3 hoardings (size 40*20 ft) assumed in a stretch of 1 km, cost estimate based on primary research
Litterbins	No.	3	3,000	9,000	<ul style="list-style-type: none"> 3 litterbins (dual pole mounted) assumed in a stretch of 1 km at a cost of INR 3,000 each
Unipoles	No.	10	3,00,000	30,00,000	<ul style="list-style-type: none"> 10 unipoles (size 16*8 ft) assumed in a stretch of 1 km Cost estimate based on primary research
Newsstands	No.	2	4,00,000	8,00,000	<ul style="list-style-type: none"> 2 digital newsstands (size 16*10 ft) assumed in a stretch of 1 km, at a cost of INR 4,00,000 each, with one side available for displaying advertisements Cost estimate based on primary research
City information panels	No.	2	4,00,000	8,00,000	<ul style="list-style-type: none"> 2 digital city information panels (size 16*10 ft) assumed in a stretch of 1 km, at a cost of INR

COMPONENT/ ACTIVITY	Unit	Unit (No.)	Costs per unit (INR)	Total Cost (INR)	Remarks/ Assumptions
					4,00,000 each, with one side available for displaying advertisements
Signboards	No.	4	3,00,000	12,00,000	<ul style="list-style-type: none"> 4 signboards (size 16* 8 ft) assumed in a stretch of 1 km, cost INR 3,00,000 each Cost estimate based on primary research
Contingency	%	10		98,36,760	<ul style="list-style-type: none"> Contingency cost taken to be 10% of capex.
Total Capex				10,92,04,360	

Operation and maintenance costs:

COMPONENT/ ACTIVITY	Unit	Unit (No.)	Cost per unit (INR)	Total Cost (INR)	Remarks/Assumptions
Operations & Maintenance of street infrastructure	% of total capex	5	-	54,63,645	<ul style="list-style-type: none"> O&M Costs assumed at 5% of total capex costs
Capital Repayment	% of total debt	5	-	38,24,551	<ul style="list-style-type: none"> 70% debt equity ratio 20 year repayment period Equal repayments every year
Interest Repayment	% of total outstanding debt	11	-	43,21,743	<ul style="list-style-type: none"> 11% interest rate p.a. Average interest paid per year over a 20 year period
Total Opex				1,35,56,512	

Revenue estimates:

SOURCE	Unit	Unit (No.s)	Revenue per unit per year (INR)	Total Revenue per year (INR)	Remarks/Assumptions
Advertisement					
Bus shelters	No.	2	2,00,000	4,00,000	<ul style="list-style-type: none"> 2 bus shelters assumed in a stretch of 1 km, each fetching INR 20,000 per month from advertisement

SOURCE	Unit	Unit (No.s)	Revenue per unit per year (INR)	Total Revenue per year (INR)	Remarks/Assumptions
					<ul style="list-style-type: none"> • Occupancy of advertisement spots = 10 months per year
Public conveniences	No.	1	1,50,000	1,50,000	<ul style="list-style-type: none"> • 1 public convenience assumed in a stretch of 1 km • No user charges (free public conveniences) • Occupancy of advertisement spots = 10 months per year
Hoardings	No.	3	3,00,000	9,00,000	<ul style="list-style-type: none"> • 3 hoardings (size 40*20 ft) assumed in a stretch of 1 km • Occupancy of advertisement spots = 10 months per year
Gantries	No.	3	3,00,000	9,00,000	<ul style="list-style-type: none"> • 3 gantries (size 40*8 ft) assumed in a stretch of 1 km • Occupancy of advertisement spots = 10 months per year
Unipoles	No.	10	1,50,000	15,00,000	<ul style="list-style-type: none"> • 10 unipoles (size 16*8 ft) assumed in a stretch of 1 km, fetching INR 15,000 each per month • Unipoles are double sided, with advertising potential on both sides • Occupancy of advertisement spots = 10 months per year
Newsstands	No.	2	1,00,000	2,00,000	<ul style="list-style-type: none"> • 2 newsstands with advertising potential on one side each, fetching INR 10,000 each per month • Occupancy of advertisement spots = 10 months per year
City information panels	No.	2	1,00,000	2,00,000	<ul style="list-style-type: none"> • 2 city information panels with advertising potential on one side each, fetching INR 10,000 each per month • Occupancy of advertisement spots = 10 months per year
Other revenue sources					
Naming rights	No.	1	15,00,000	15,00,000	<ul style="list-style-type: none"> • Based on the figure of INR 3 crore per annum for 10km







SOURCE	Unit	Unit (No.s)	Revenue per unit per year (INR)	Total Revenue per year (INR)	Remarks/Assumptions
					elevated corridor in Bangalore provided by JCD <ul style="list-style-type: none"> 50% discount over cost given which is assumed for regular roads
FM Radio Speaker in bus shelters	No.	2	5,00,000	10,00,000	<ul style="list-style-type: none"> Revenue from FM radio at bus shelter
Total Revenue				67,50,000	

Since annual operation and maintenance costs for street infrastructure exceed the annual estimated revenues, street infrastructure projects would need financial grants to be financially viable.

3.4.3 EVALUATION OF PPP MODELS PROPOSED

Each of the proposed PPP models has its own pros and cons, and different models may be suitable in different contexts. The models have been evaluated on the following parameters to ascertain their viability and a comparative assessment has been made.

Exhibit 17: Parameter –wise feasibility of PPP models for street infrastructure

	Composite BOT	De-linked BOT	O&M fee
 Operational efficiency	High, since single private operator operates the entire system – revenue through advertisement is linked to operational efficiency	High, since operator assumes revenue risk, and would try to operate in the most efficient manner	Low, since the private player is assured of a pre-decided O&M fee, and lacks incentive to improve efficiency
 Investment Requirement	High for private sector participant, minimal investment on the part of the Authority	High for private sector participant, minimal investment on the part of the Authority	High for private sector participant, minimal investment on the part of the Authority
 Access to finance	Low, since operator assumes revenue risk, and revenue is dependent on several uncontrollable factors	Low, since operator assumes revenue risk, and revenue is dependent on several uncontrollable factors	High, since the private player does not assume revenue risk, thus offering comfort to the lenders
 Incentives for private player	Low, since the private player with expertise in street landscaping may not be interested in street furniture component (and vice-versa)	Medium, since the private player can provide services in the area where it specializes, however it assumes revenue risk	High, since the private player is assured of a pre-decided O&M fee and does not assume revenue risk
 Project viability	Viable, if revenue safeguards are in place and exclusivity of advertisement rights is given to the operator	Viable, if revenue safeguards are in place and exclusivity of advertisement rights is given to the operator	Viable, if advertisement revenue is exploited by the authority in the most efficient manner possible
 Suitability	Suitable for metro/ tourist cities, and when greenfileed streets projects need to be developed	Suitable for metro/ tourist cities, and when greenfileed streets projects need to be developed	When the Authority has the financial strength to assume revenue risk and limited experienced private operators exist

4. PUBLIC BICYCLE SHARING SCHEME

The term Public Bicycle Sharing (PBS) System describes a network of bicycles distributed across an urban area, available for public access from docking stations. Public bicycles can be picked up at any station and returned to any other station/area/market in the network area, making them appropriate for point A to point B travel. PBS is a non-motorized transport mode designed to encourage short utilitarian trips and for encouraging the use of environment-friendly, cheaper and more convenient travel techniques compared to motorized transportation. At the same time, PBS can also be targeted at tourists and leisurely bicycle trips.

Globally, bike sharing schemes have existed for almost 50 years but significant growth has been seen only in the last decade. The rapid growth in the last few years is attributed to the introduction of third generation of bike-sharing programs which utilise technologies such as GPS tracking system, improved bicycle locking systems, electronic booking and automated payment systems, etc. Over the last decade, PBS scheme has grown exponentially in terms of use and has now become a mainstream public transport option in European cities such as London, Paris, Copenhagen and the Chinese cities of Hangzhou and Shanghai. Compared to other transport networks, a cycle sharing scheme is low cost and easy to implement, which proves to be the major reason for its global boom. The general trend globally has been that even though such projects have not been financially attractive, ULBs have supported such schemes. This is due to the fact that marginal cost of investment in PBS is generally set off by an equal or higher marginal benefits. These benefits can come in the form of transportation benefits to the people of the community, and health and environmental benefits that improves regional quality of life.

In India, however, cycle sharing as a means to provide last mile connectivity has not been given priority so far. For stretches where the distance is too long to be covered by foot and too short to hire any other mode of transport, bicycle sharing could emerge as a logical solution. However, factors such as increase in trip length due to urban sprawl, increase in purchase power of people and inadequate facilities and infrastructure for cycling have contributed to reducing cycling to less than 11% of the mode share in 2007, down from nearly 30% in 1994¹⁴. In spite of its benefits, very few Indian cities such as Mysore, Delhi, Mumbai, Ahmedabad and Bangalore have witnessed the introduction of PBS scheme, and the success rate has been low. Poor image of cycling, lack of dedicated cycling lanes and encroachment of the existing cycling lanes by motorists emerge as the major challenges to the low rate of success of cycle sharing in India.

With the burgeoning pollution levels in Indian cities, non-motorized transport and specifically PBS, is gaining prominence in recent policies and schemes of the GoI. The NUTP 2006, for example, mentions that the Central Government would give priority to the construction of cycle tracks and pedestrian paths in all cities, under the National Urban Renewal Mission (NURM), to enhance safety and thereby enhance use of non-motorized modes. As per the policy, cities would also be encouraged to explore the possibility of a public bicycle program, where people can rent a bicycle for use in specially designated areas. The Recommendations of the Working Group on Urban transport for the 12th FYP also lay emphasis of NMT. They highlight the need for creation of a dedicated NMT cell in each

The Recommendations of Working group on Urban Transport for 12th FYP recommend that priority in planning to modes should be as follows:

- 1) Walk and Non-motorised transport (NMT);
- 2) Other motorized public transport;
- 3) Mass rapid transit; road, rail and waterways;
- 4) Personal vehicle transport.

¹⁴ Recommendations of Working Group on Urban Transport for 12th FYP

municipality/municipal corporation to work towards making cycling a fashion statement in India and to provide safe pedestrian and cycle infrastructure. Also, they recommend that the Government of India should fund launch of PBS scheme in all cities in India with a population of more than 5 lacs. It also states that city-wide footpaths for walk and dedicated lanes for bicycle should be provided to promote green modes of transport. The plan estimates investment requirement of INR 2000 crore for NMT and intermediate para-transit projects, and envisages the entire fund requirement coming from the GoI. With the GoI proposed to fund the entire NMT requirement, the focus being placed on this mode is evident. Specifically with regard to PBS, investment in cycle stations and control centre is proposed to be undertaken by the Government, while the provision of cycles and O&M of the scheme are envisaged on PPP basis¹⁵.

4.1 PUBLIC PRIVATE PARTNERSHIPS IN PUBLIC BICYCLE SHARING

Towards the late 1990s, two global advertising competitors, JCDecaux and Clear Channel, identified a new opportunity to access advertising space in key urban markets by entering the public bike operation arena. Already engaged in contracts to provide street furniture and transit shelters to transportation and municipal agencies both companies went on to establish successful automated bike sharing programs, notably Clear Channel in Barcelona and JCDecaux in Paris and Lyon. Today, PPP models in PBS can be seen in a large number of European cities, where advertising companies in lieu of advertising space, provide equipment for the bicycle scheme and operate and maintain the system. The distribution of roles and responsibilities in a PPP model for public bicycle sharing is described below (Adapted from Bike Sharing Guide (Gris Orange Consultant, 2009)).

Globally, PBS schemes have been implemented through PPP mode with considerable success, though in India PBS is still in the nascent stage. In most cases, the Authority specifies docking stations locations and provides space for stations. It also provides the advertising spots and undertakes construction of supporting infrastructure such as bicycle tracks. Depending on the type of contract, the authority may also invest in the bicycles and the construction of docking stations. The private player (which is usually a private advertising company or a private bicycle operator) usually provides the bicycles, station infrastructure and related equipment, and operates the service through its own appointed staff. The typical sources of revenue include advertisements, sponsorships and membership charges/ user charges.

Delhi cycle hiring scheme

The “Planet Greenbike” initiative was launched in October 2009 in Delhi. It currently serves along the erstwhile BRT corridor from Ambedkar Nagar to Moolchand. Currently, it is operating 100 bicycles in the whole system. Planet Green Bikes intends to encourage people to use cycles, in order to develop an eco-friendly environment near Metro Stations and at the BRT Corridor in Delhi by discouraging petrol/diesel driven vehicles on roads. A compulsory photo ID proof (Voters ID Card / Driving License or original passport) has to be submitted and the mobile number has to be given at the time of taking the cycle. In case of any physical damage to the bicycle, the rider is charged.

Rate Structure: Minimum Rent is Rs.10 for 4 Hours and every extra Hour is charged at Rs.5. The annual membership fee is Rs.100.

¹⁵ Recommendations of Working Group on Urban Transport for 12th FYP

Paris Velib Public Bicycle Sharing

Vélib' is the world's third-largest bike-sharing program and the largest outside of China. Launched in Paris in 2007, the service has expanded to offer a rental point at five-minutes' walk from every point throughout the centre of Paris. The Vélib' scheme introduced 10,000 bicycles to the city with 750 automated rental stations in 2007, but now has reached double that with 20,000 bicycles in circulation between 1451 stations. Each station has 15 or more bikes. Users can either have an annual membership or pay for short term subscriptions for daily or weekly usage. A one-day subscription costs 1 Euro, a weekly subscription costs 5 Euros and an annual membership costs 29 Euros. In addition to paying the subscription fee, short term users must pay a security deposit of 150 Euros, which is pre-authorized on their credit card to help guarantee the return of the bikes.

The cycle system is installed and operated by outdoor advertising agency JCDecaux at no cost to the city, in exchange for exclusive street advertising rights. The system functions under a ten year outdoor advertising contract, allowing advertising rights on 1628 bus shelters, newsstands, public toilets, and other street furniture. In return, JCDecaux covers all of the costs for the Vélib' system. In addition, JCDecaux pays Paris all the revenue from cycle rentals and annual subscriptions, plus an estimated €3.5 million per year from its advertising (or possibly more if ad sales surpass certain targets). The bikes are available 24 hours per day and 7 days per week. Under the Vélib cycle hire scheme, the yearly subscriber's card is RFID enabled (like London's Oyster cards) and allows them to swipe the card at any bicycle docking point without having to use the central service terminal of the rental station. The cycles used in the system are designed by JCDecaux.

Exhibit 18: Key Challenges in PBS



4.2 KEY BARRIERS

While public bicycle sharing schemes under PPP have been implemented with considerable success abroad, their implementation in the Indian context faces several challenges. The challenges have been broadly divided into institutional, planning, contractual arrangement and project implementation aspects. Some of the key challenges have been listed in the exhibit below and they have been further detailed in this section.

4.2.1 POLICY AND INSTITUTIONAL

Under institutional arrangement, the primary barrier for effective implementation of PPP projects in PBS is the lack of policy thrust and limited focus of city authorities on promoting PBS schemes.

- Lukewarm inclination of city authorities towards the scheme:** Strong inclination of city authorities plays a pivotal role in driving a city towards implementation of public bicycle sharing schemes. However, inclination of city ULBs in implementation of PBS schemes is lukewarm. Despite finding a place in National Urban Transport Policy (NUTP 2006), bicycle sharing has not received adequate attention and has suffered from lack of interest and support from the concerned government agencies. Though the current pilot projects are on PPP model where the private parties are responsible for building and operating the system over a decided concession period, the government has been reluctant in providing necessary financial assistance or other support like land, leading to unnecessary delays in setting up of the systems. For instance, Delhi Metro Rail Corporation (DMRC) had signed a contract with Greenolution, a private advertising company to set up 20 bike-sharing stations on a Build Operate Transfer (BOT) basis in 2007. However, the company was able to set up only one station by 2012. The operator highlighted that the lack of interest and unwillingness to devote resources on part of DMRC are the main reasons for the delay in scaling up of services.
- Inexperience in implementing PBS projects on PPP affects institutional readiness:** PBS being a relatively new concept in India, city authorities are not experienced in implementing such projects, especially through PPP mode. The scheme is still in an evolving phase, and cities are experimenting with various models, given the lack of any established successful models. While lessons are being drawn from international experience, customizing the international success stories to the Indian context is a challenge that the city authorities face. On the private side, limited competent operators exist in the PBS space. Institutional readiness is low and the sector is in an exploratory stage.

Smartbike, Washington DC

Smartbike, US's first fully automated bike sharing scheme, was a PPP between Clear Channel Outdoor and District of Columbia Department of Transport. The system was a pilot with 10 stations and 120 bikes. The small number of bikes and stations coupled with large distances between stations resulted in the scheme being poorly utilised and thus largely unsuccessful. Smartbike was replaced by Capital Bikeshare in September 2010 with 1100 bicycles and 116 stations which has been successful.

4.2.2 PLANNING AND DESIGN

The planning phase builds the foundation for the success of PBS, thus, planning should be the first step before initiating PBS schemes. The planning phase sets the objectives, involves various stakeholders, and provides information that can help in determining the spatial distribution of public bicycles and stations, which will ultimately determine the ideal service area for the public

bicycle system. As was the case in city bus private operations, this important step is usually ignored before initiating public bicycle sharing leading to difficulties at project implementation stage.

The planning barriers has been separated into technical barriers and financial barriers and are provided below.

Technical

- **Lack of comprehensive and integrated planning:** Multiple agencies are involved in creation of infrastructure within cities. Hence, bicycle infrastructure such as marked bicycle lanes, depots which are essential public bicycle infrastructure is not ready and available in time. In a municipal setting, the Municipal Corporation as well as Public Works Department share the responsibility of construction of road infrastructure. The planning could be done by the Municipal Corporation, development authority or the individual agency doing the construction. The availability of infrastructure depends on the planning priorities of different agencies involved in creation of infrastructure. This disconnect between the authorities undertaking the planning and implementation can lead to disjointed infrastructure which does not help in the success of PBS. Currently, there are multiple operators working in isolation in Delhi as well as Bangalore to provide service in different parts of their respective cities. Most of these initiatives started as pilot projects in different city areas. Due to lack of an integrated or strategic city level plan to develop a citywide bike-sharing facility, there is no integration among these different systems run by different operators. In a few cases like Planet Green Bikes in Delhi, there is no integration amongst the various stations of the same operator. Each station serves as a separate cycle rental and not as a cycle-sharing system, i.e., a person who rents a cycle from one station has to return it to the same station and cannot return it to any of the other stations of Planet Green Bikes. This defeats the entire purpose of a bicycle-sharing facility and makes it extremely inconvenient for the users.
- **Lack of demand assessment:** Several cities have not undertaken traffic demand studies that can help in determining the spatial distribution of public bicycles and stations leading to unsuccessful system. For a successful PBS implementation, the private sector proponent should have a good idea of the demand centres and origin/destination information. In successful PBS implementations, the cities involved have already undertaken this exercise so the private sector proponent can come with a good business model for the success of PBS.
- **Weak bicycle re-distribution mechanism:** Redistribution of bikes implies ensuring an equitable distribution of bikes across the docking stations. Not surprisingly, stations located at popular spots such as malls are chronically empty of bikes – as the customers ride from such spots to their destinations, but might those destinations may not attract the same demand as the popular spots. Bikes also tend to collect in stations in the city centres and stay there. This poses a significant system design challenge and impacts the revenue potential of the system. Ideas for re-balancing the system can include a dedicated team with a vehicle for redistribution and a premium (incentive) to return bikes at popular stations.

Financial

Financial sustainability of public bicycle sharing is one of the most important factor for effective implementation of PPP projects. Financial sustainability of projects in India is difficult as seen from cases in Pune (Cycle Chalao), Delhi (GreenBIKE), and Thane (FreMo). The key financial challenges are:

- **User fees insufficient for covering operational costs:** Fare box collection estimates from several Indian schemes indicate that fare box revenue is not sufficient to cover even the operational expenditure. Industry experts estimate capital expenditure of INR 55000 per cycle including civil structures and bicycle and operational expenditure of INR 45000 per cycle per annum, which is not sustainable with fare box collection. Fare box recovery, a metric which measures percentage of operating costs that are covered by membership and user fees, ranges from 36% (Boulder, USA), 60% (Toronto, Canada) to 88% (Boston, USA) (ITDP, 2013). Fare box recovery in Indian cities is also poor and GreenBike in Delhi is unable to cover even the cost of station guards from fare box revenue. Given the low revenue potential, private players are not incentivised to invest in PBS projects, and the prospects of a successful PPP contract are hampered.
- **Lack of government funding support:** As outlined in the responsibility of the municipality in a PPP model, the municipality may bear some cost for capital and operating expenses. This funding support assumes even greater context in the context of Indian cities, where PBS is a relatively new concept and demand is uncertain, making private players apprehensive of investing all the capital on their own. In Indian cases studied, this backing is not available and entire financial risk is borne by the private sector proponent. At the same time, there is no central government grant scheme for PBS as was done previously with JnNURM (ended in 2015) which provided grant for bus procurement. Apart from this, we also find that funding allocation for NMT is limited in the budgets of the municipalities.

“GreenBiKE” – Cycle Feeder and Rental Scheme, New Delhi

Delhi Integrated Multimodal Transport System (DIMTS) signed an agreement with Plant Advertising Pvt. Ltd. to build, operate and manage the bicycle stations along the BRT Corridor for a period of 5 years. The concessionaire’s revenue is through selling the advertisement space on bicycle station and hire charges. The revenue from user fees hardly covers the salary of station guards, thus, the project mainly relies on advertisement for revenue.

- **Access to advertising revenue not always available:** PBS operators in India such as the Delhi Metro Cycle Feeder Service have limited recourse to using advertisements to supplement the user fees whereas successful bicycle sharing systems abroad have integrated advertising revenues to supplement the low (or none) user fares. Without access to advertisement revenue and fare box recovery rates being low, the private sector proponent has no incentive to operate PBS under PPP as it is not getting sufficient return on the capital it is investing.

4.2.3 CONTRACTUAL ARRANGEMENT

PPP based contracting for public bicycle schemes in India is at a nascent stage and there aren’t many examples of successful implementation in India. However, as was the case in City bus private operations the barrier in contractual arrangement is similar.

- **Absence of comprehensive and balanced contracts:** A PPP contract is successful only if both the parties are equal in the contract. In experience, most of the contracts are not balanced and favour the authority. The Delhi Metro Feeder Cycle Service Contract (Delhi Metro Rail Corporation, 2011) allows the authority to terminate the contract with just one month notice while private sector proponent has to give three months’ notice. The Model Concession Agreement prepared by MoUD for Public Bicycle Scheme addresses several of the issues in current contract regimes. However, it continues to have more protection for the

contracting authority. One such instance, the penalties payable by concessionaire is double that of authority for delay in fulfilment of conditions precedent.

4.2.4 PROJECT IMPLEMENTATION

In this section, challenges faced after signing of contract for effective implementation of project on PPP have been discussed.

- **Difficulty in acquisition of land space for docking stations:** There are multiple agencies that have land rights and getting approval for use of land is a difficult process. FreMo, a public bicycle-sharing scheme, in Thane faced challenge of acquiring depots at strategic locations. Each depot, being located in important transport junctions, was extremely expensive, which the service provider had to acquire without financial aid from the government. The delay in acquisition of land or unavailability of land in strategic location can lead to an unsuccessful system.

Delhi Metro Cycle Feeder Service, New Delhi

Delhi Cycles Private Ltd. operates bicycle sharing scheme in Rohini (East) and Rohini (West) metro stations with sub stations in nearby areas. The service faced delay in getting approval from the Delhi Government for using land spaces in various parts of Delhi as sub-stations as approval was required from Delhi Metro Rail Corporation, New Delhi Municipal Council, Municipal Corporation of Delhi, Public Works Department and Delhi Development Authority.

- **Threat of vandalism/ theft:** Theft and vandalism of bicycles is a major challenge with over 9000 bicycles stolen or damaged in Vélib', Paris' bike-sharing system in 2012 (France24, 2013). Anti-theft technologies add cost to the private sector proponent reducing the incentive for private participation in PBS. However, once investment in modern technologies (such as anti-theft systems) is made, it pays off by reduced risk of theft.

Clear Channel bikes (used in Barcelona) have a unique identifier and use a system of GPS tracking to reduce theft. The OYBike in London has an anti-theft system that uses an algorithm to generate unique codes to open and lock the bikes. A flexible cable with connection points at both ends is mounted in a socket that rotates 360°. This effectively denies a would-be vandal any point of leverage to try and break the locking device.

Cykul, a community of cyclists, organized a 15 day cycling event in DLF Cyber City, the commercial business district of Gurgaon. Termed as Cykulothon, the event aimed to create health and wellness awareness for corporate employees. The objective of the indoor cycling event was to promote cycling as a health and wellness sport. Such awareness events can go a long way in changing the perception of cycling and creating demand for a PBS scheme.

- **Poor perception towards cycling in India:** One of the major hindrances to private participation in PBS scheme in India is the limited revenue generation capacity, arising from scanty demand due to the positioning of cycling as a poor man's mode of transport. This poor image can detract private sector proponent from PPP arrangement as this perception affects demand from end users and ultimately affects project viability. In order to invite private participation, cycling needs to be rebranded as a mode of transport to generate

sufficient demand. Positioning cycling as an eco-friendly and accentuating on the health benefits of cycling could be an important measure towards this end.

- **Absence of user-friendly cycling infrastructure:** A major impediment to the adoption of cycling as a mode of transport in India is the lack of safe, dedicated cycling tracks. In order to stimulate demand for a PBS scheme, supporting infrastructure such as dedicated cycling tracks need to be developed before implementing the scheme. This would enable private operators to see potential and in such projects, and would incentivize them to participate. Provision of dedicated cycle tracks on the Delhi BRT corridor stretch of 5.6 km has led to 50% increase in the speed of cyclists from 8 kmph to 12 kmph. This has resulted in time saving for cyclists of 2.5 minutes per km. Risk exposure of cyclists to accidents has reduced from 0.263 to 0.002 (99% reduction).¹⁶ In Mumbai, 13 km cycle track has been constructed at Bandra Kurla Complex, while Ahmedabad BRTS has a 20 km cycling track. The dedicated cycling tracks need to be supplemented by a safe cycling environment in terms of adequate street lighting and strict enforcement of the prohibition of use of tracks by motorists.

4.3 RECOMMENDATIONS TO ADDRESS BARRIERS

Having identified the barriers above, the objective of this section is to provide suggestive actions to address those barriers. In order to enable successful implementation of PPP projects in public bicycle sharing schemes, a facilitating environment needs to be created for the private player.

¹⁶ http://www.teriin.org/eventdocs/files/Cycling_Report_LR.pdf

Exhibit 19: Barriers to PPP in PBS and corresponding recommendations

Barriers	Suggestive action	Action by	Time period*
POLICY & INSTITUTIONAL			
Lukewarm inclination of city authorities towards the scheme	<ul style="list-style-type: none"> Center / State / ULB budgets be considered only when a predefined minimum provision for NMTs is made for in urban transport budgets for achieving specified levels of NMTs share. 	Central/ State government/City Authority	Medium term
Inexperience in implementing PBS projects on PPP affects institutional readiness	<ul style="list-style-type: none"> Guidelines documents on PBS schemes on PPP/ model contract documents to be drafted and made available to the city authorities 	Central Government/State Government	Medium term
PLANNING & DESIGN			
Lack of comprehensive and integrated planning	<ul style="list-style-type: none"> Given the high interdependency of PBS scheme with other transport modes, creation of a unified transport authority in the form of UMTA that ensures integrated planning becomes critical Preparation of CMP and provide importance to NMT in additional to other transport mode. 	Central/ State government/City Authority	Medium term
Lack of demand assessment	<ul style="list-style-type: none"> Authority to make spatial and temporal travel demand for NMT trips, its infrastructure – main and auxiliary docking stations; route network, obstacle free tracks 	City authority/private operator	Medium term
Weak bicycle re-distribution mechanism	<ul style="list-style-type: none"> Dedicated team with a vehicle to re-distribute bikes across docking stations A premium (incentive) to return bikes at popular stations 	Private operator, city authority	Short term
User fees insufficient for covering operational costs	<ul style="list-style-type: none"> Fix and review /revise user tariffs considering cost of inputs including reasonable profitability for investors as also affordability by users. Revenue – expenditure gap if any be made good in the form of budgetary support by the state. 	State Government/City Authority	Short term

Barriers	Suggestive action	Action by	Time period*
Lack of government funding support	<ul style="list-style-type: none"> • Dedicated government grants for PBS schemes, given that the feasibility of such projects is questionable 	Central Government/State Government	Medium term
Lack of safety of PBS users on road	<ul style="list-style-type: none"> • Dedicated cycle tracks with hindrance free/ grade separated negotiation of intersections for safe travel • Provision of cycle track in the master plan • Integrated NMT planning to be adequately covered in the master plan 	State Government/City authority	Long term
Lack of capacity for NMT infrastructure design in an optimal manner	<ul style="list-style-type: none"> • State / ULBs / to out-source services of national / international agencies for the purpose initially; develop model / modular designs / specifications, service quality standards etc. for use by city authorities 	State Government/ City authority	Medium term
CONTRACTUAL ARRANGEMENT			
Absence of comprehensive and balanced contracts	<ul style="list-style-type: none"> • Development of model contract documents along with guidelines for PBS schemes 	Central Government/State Government	Short term
PROJECT IMPLEMENTATION			
Difficulty in acquisition of land space for docking stations	<ul style="list-style-type: none"> • Once mandated, above such land spaces be available as part of PT infrastructure. • State / ULBs to simplify the process of land acquisition • In other cases ULBs to expeditiously acquire land parcels and hand over to the PBS operator. 	State Government/City Authority	Short term
Threat of vandalism / theft	<ul style="list-style-type: none"> • Safeguards against vandalism/theft through implementation of modern technologies and anti-theft systems • Bikes be equipped with RFID for ease of tracking 	Private operator, city authority	Short term

Barriers	Suggestive action	Action by	Time period*
	<ul style="list-style-type: none">PBS Stations be equipped with CCTV systems and connected to control room.		
Poor image of cycling	<ul style="list-style-type: none">Re-positioning cycling as a preferred mode of transport through awareness campaigns	Private operator, city authority	Medium term

**Short term: upto 1 year, Medium term: 1 to 3 years, Long term: more than 3 years*

4.4 GENERATION AND EVALUATION OF PPP OPTIONS

The activities involved in the entire value chain of public bicycle sharing scheme have been described below. Based on the allocation of responsibility for undertaking each of these activities, three types of PPP models have been developed. These models have then been evaluated on several parameters to assess their viability and a comparative assessment has been made.

4.4.1 VALUE CHAIN ACTIVITIES

A host of activities are involved in the development and operation of a public bicycle sharing scheme. The first phase is planning and designing, which involves activities such as demand assessment, setting service standards and system specifications, operational planning, tariff fixation and structuring and investment planning. The successive phase is the implementation phase, involving the broad activities of land acquisition, civil construction, obtaining utilities connections, procurement of bicycles and equipping of docking stations. This is followed by the operation and management of the system, which covers a number of activities for undertaking the day to day operation and maintenance of the system. The activities involved in the value chain of development and operation of public bicycle sharing scheme are described below. These responsibilities have then been assigned to the private player or the public authority, and three PPP models have been developed.

I. PLANNING AND DESIGNING:

Demand Assessment: The first activity in the planning phase is the assessment of demand for the public bicycle sharing scheme. The willingness to use the scheme needs to be gauged, including the areas where this scheme would be most used. Both temporal and spatial demand needs to be estimated.

Setting service quality standards and system specifications: This activity involves specifying the service standards for the public bicycle sharing scheme. This includes aspects such as the number of PBS docking stations, number of bicycles per docking station, the type of docking stations (covered/ uncovered, manned/unmanned), the specifications of the bicycles to be procured, the revenue collection mechanism (in case of a paid scheme), etc.

Operational Planning: The operational plan for the scheme needs to be worked out, including the timings during a day for which the scheme would be operational, the number of docking stations in a city, the number of bicycles at each docking station, the revenue collection mechanism etc.

Tariff Fixation and structuring: Decisions need to be taken on whether the system would be a paid one or a free scheme with a security against use of the bicycles. In case of a paid scheme, the tariff needs to be decided and structured, based on the willingness to pay for use of the services. The tariff needs to be structured in a manner that incentivizes the potential users of the system to shift away from motorized modes of transport.

Investment Planning and Funding: The investments required for the setting up of docking stations and the procurement of bicycles need to be planned for. The capital as well as operational costs involved in the system need to be estimated, and accordingly, funding needs to be arranged.

II. IMPLEMENTATION:

Land acquisition: Land for construction of the docking stations needs to be acquired from the concerned land-owning authority (usually the Municipal Corporation/RWA/Development

Authority). Irrespective of the PPP model adopted, it is suggested that the public authority undertaking the public bicycle sharing scheme acquires the land.

Civil construction and obtaining utilities connection: This involves the construction of the docking stations, control room and kiosks, if any. The construction would be in line with the standards set during the planning stage. For example, one city may choose to construct open docking stations with a shed overhead, while another may choose to construct a closed station with an enclosure for greater safety. Utility connections such as electricity connection for the control room and at docking stations need to be obtained at this stage.

Providing advertising space: In case revenues are envisaged from advertisement spaces across the city to fund the public bicycle sharing scheme, then the Authority would be responsible for providing advertisement spots, based on the quotes of the operator and its own advertisement spots inventory.

Procurement of bicycles/ revenue collection mechanism: This activity includes procurement of the bicycles as per the design standards set out at the planning stage. It also includes collection of revenue through the mechanism decided at the planning stage (manual v/s automated).

Equipping of docking stations: Equipping of docking stations includes provision of required equipment such as ticket vending machines, card swiping equipment, bicycle docks etc.

III. OPERATIONS AND MANAGEMENT

Service quality monitoring: This activity involves monitoring the delivery of public bicycle sharing services as outlined at the planning stage. Irrespective of the contract type selected, the role of monitoring the operations would remain with the public authority. Monitoring parameters could include timeliness and safety of the service, reliability and cleanliness etc.

Customer service/ marketing and branding: This activity involves operating the service, including attending to the grievance of the users, as well as marketing and branding activities to promote the usage of the system. Marketing activities for public bicycle sharing should include developing and implementing a marketing program that will optimize trial, system use and project image, developing social marketing campaigns aimed at increasing driver awareness of common cyclist behaviour and willingness to share road infrastructure; engaging cycling advocacy communities and other stakeholders and designing and delivering education programs for new cyclists.

Maintenance of bicycles/ docking stations: This involves regular maintenance of the bicycles as well as maintenance of the docking stations and associated facilities.

Redistribution: Redistribution of bikes implies ensuring an equitable distribution of bikes across the docking stations. Not surprisingly, stations located at the top of hills are chronically empty of bikes – as the customers ride down the hill but do not wish to make the return trip up hill. Bikes also tend to collect in stations in the city centres and stay there. Ideas for re-balancing the system, other than a dedicated team with a vehicle, can include a premium to return bikes at a lower elevation or conversely a credit for each bike returned to a higher elevation.

Revenue collection: This involves the collection of fare revenue from the users in case of a paid system, through the revenue collection mechanism decided at the planning stage. The mechanism could be a manual one or a fully automated smart card based system, depending upon the specific context of a particular city.

MIS Data Acquisition and Analysis: Data with respect to the number of trips undertaken during a day, along with the details of peak hour trips needs to be collected and analysed for system improvement. Usage patterns need to be drawn so that the system can be designed and modified in a manner that best serves the city requirements.

Control room operation and management: The central control room needs to be staffed with skilled personnel and day to day operation of the control room needs to be carried out. Since the control room would perform the function of monitoring the system performance through data received by it, it is recommended that this activity be retained by the public authority, irrespective of the type of model adopted.

4.4.2 PPP MODELS IN PUBLIC BICYCLE SHARING SCHEME

Based on the allocation of responsibilities for the various identified activities in the value chain of PBS development and operation, the following three types of PPP models have been proposed:

1. BOT Model
2. O&M Model
3. Turnkey

I. BOT MODEL

Under this model, the Authority plans the PBS scheme, undertakes demand assessment, acquires land, provides specifications for the design of bicycles and layout of the docking stations, and sets service quality standards. The Authority then engages a Private Operator to build the civil infrastructure and operate the scheme. The operator procures the bicycles, operates and maintains PBS and collects user fees, advertisement revenue, kiosk rental. The public authority continuously monitors the performance of the private operator against the pre-specified standards. The Bidding parameter is the System Management Fee (Positive/Negative).

RESPONSIBILITY ALLOCATION

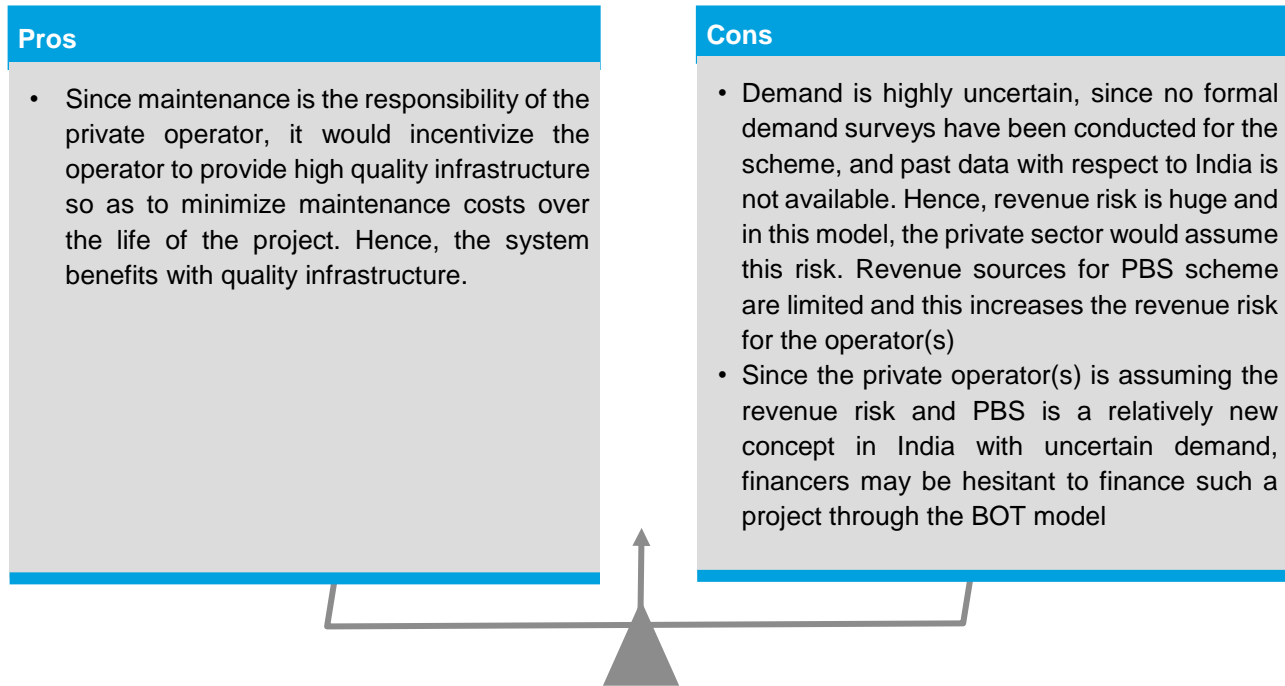
The division of responsibility between the public authority and the private player under this model is provided below.

Exhibit 20: Responsibility Allocation under BOT model

PHASE	PLANNING	IMPLEMENTATION	O&M
		MONITORING	
ACTIVITY	Demand Assessment	Land Acquisition	Service Quality Monitoring
	Service Quality Standards / Bicycle Specifications	Civil Construction and Utilities Connection	Customer Service / Marketing and Branding
	System Specification – Number of Bicycles, Siting of Docking Station	Providing advertising space	Maintenance of Bicycles/Docking Stations
	Operation Plans – Operation Span/Time	Control Room Construction	Redistribution
	Tariff Fixation/Structuring	Kiosk Construction	Revenue Collection
	Investment Planning and Funding	Procurement of bicycles / revenue collection equipment	MIS Data Acquisition/Analysis
	System Detailed Design	Equipping docking stations	Control Room O&M
Legend	AUTHORITY		
	PRIVATE OPERATOR		

PROS AND CONS

The pros and cons of the BOT model are described below.



II. O&M MODEL

Under this model, the Authority undertakes demand assessment, acquires land, provides bicycles and docking stations, constructs control room and other civil infrastructure and sets service quality standards. The Authority hires a private operator to operate and maintains PBS, in lieu of a fixed O&M Fee. The private operator collects user fees, advertisement income and kiosk rental. The bidding parameter is the O&M fee quoted by the private operator.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under this model is provided below.

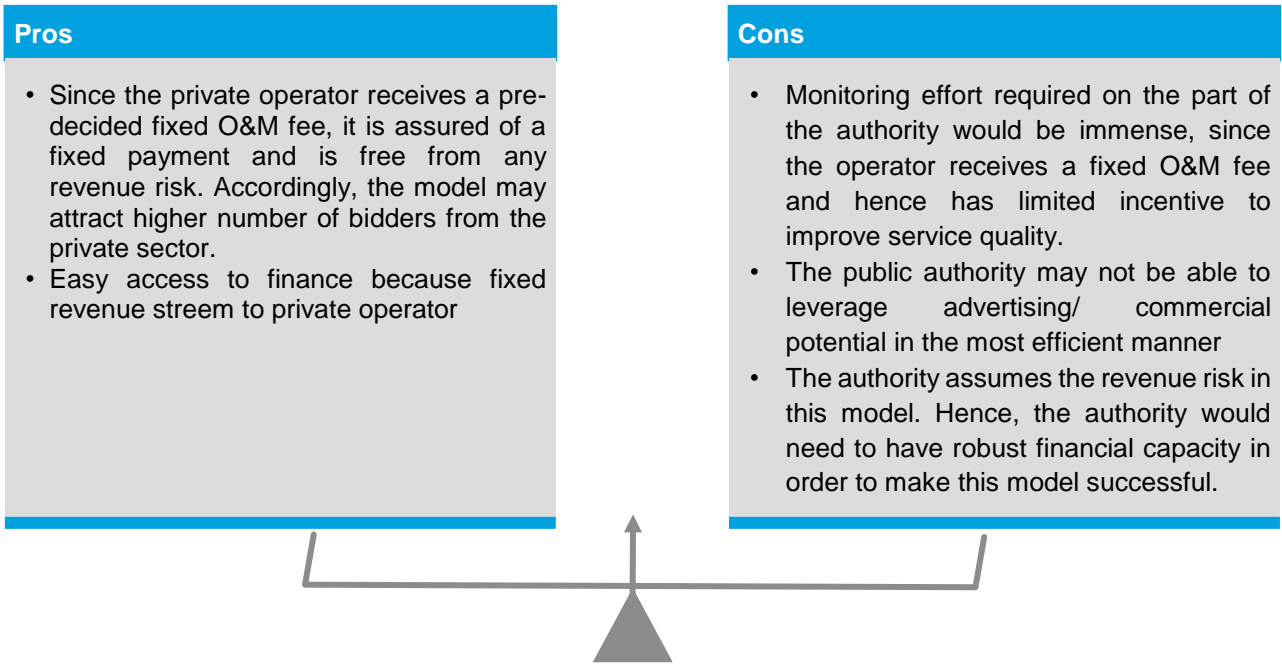
Exhibit 21: Responsibility Allocation under O&M model

PHASE	PLANNING	IMPLEMENTATION	O&M
		MONITORING	
ACTIVITY	Demand Assessment	Land Acquisition	Service Quality Monitoring
	Service Quality Standards / Bicycle Specifications	Civil Construction and Utilities Connection	Customer Service / Marketing and Branding
	System Specification – Number of Bicycles, Siting of Docking Station	Providing advertising space	Maintenance of Bicycles/Docking Stations
	Operation Plans – Operation Span/Time	Control Room Construction	Redistribution
	Tariff Fixation/Structuring	Kiosk Construction	Revenue Collection
	Investment Planning and Funding	Procurement of bicycles / revenue collection equipment	MIS Data Acquisition/Analysis
	System Detailed Design	Equipping docking stations	Control Room O&M



PROS AND CONS

The pros and cons of the O&M model are described below.



III. TURNKEY

Under this model, the Authority undertakes demand assessment, sets service quality standards and broad bicycle specifications. Private operator undertakes complete system design, construction, financing, operations and maintenance of PBS. Revenue accrues to the for private operator, primarily from advertisement spaces. The bidding parameter is the number of advertisement spaces.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under this model is provided below.

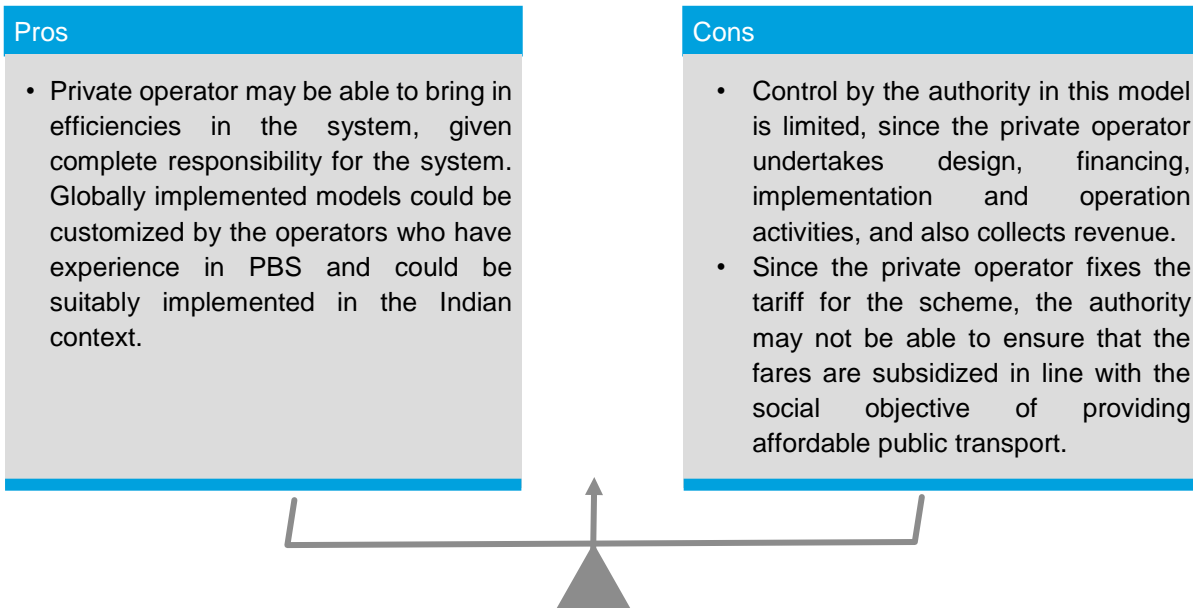
Exhibit 22: Responsibility Allocation under Turnkey model

PHASE	PLANNING	IMPLEMENTATION	O&M
	MONITORING		
ACTIVITY	Demand Assessment	Land Acquisition	Service Quality Monitoring
	Service Quality Standards / Bicycle Specifications	Civil Construction and Utilities Connection	Customer Service / Marketing and Branding
	System Specification – Number of Bicycles, Siting of Docking Station	Control Room Construction	Maintenance of Bicycles/Docking Stations
	Operation Plans – Operation Span/Time	Kiosk Construction	Redistribution
	Tariff Fixation/Structuring	Procurement of bicycles / revenue collection equipment	Revenue Collection
	Investment Planning and Funding	Equipping docking stations	MIS Data Acquisition/Analysis
	System Detailed Design		Control Room O&M

<i>Legend</i>	AUTHORITY
	PRIVATE OPERATOR

PROS AND CONS

The pros and cons of the turnkey model are described below.



FINANCIAL ASSESSMENT

Capital cost estimates: The exhibit below provides cost estimates for procurement of a bicycle fleet of 300 bicycles and 30 docking station for the bicycles.

ACTIVITIES	Unit	Unit (Nos)	Cost per unit (INR)	Total (INR Lakh)	Remarks/Assumptions
Bicycles	No.s	300	24000	72	The number of bicycles is assumed for an area of 2 square kilometer with 15 docking stations per square kilometer. Each docking station is assumed to have space for 10 bicycles. The cost includes the cost of procurement of bicycles as well as related ancillaries such as stands etc.
Docking Station and other infrastructure	No.s	300	192000	576	Docking station and other infrastructure cost per bike is considered 8 times capital cost of a bike.
Total Capex				648	

The total capital expenditure is INR 6.48 crores.

Operation & maintenance estimates (annual): The below cost estimates are for operation and maintenance of a bicycle fleet of 300 bicycles and 30 docking stations.

ACTIVITIES	Unit	Unit (Nos)	Costs per unit (INR)	Total (INR Lakh)	Remarks/Assumptions
Operation and Maintenance Cost	Nos	300	60000	180	O&M Cost is considered 2.5 times capital cost of a bike assuming automated system.
Total Opex				180	

Revenue estimates (annual):

The below revenue estimates are for operation of bicycle fleet of 300 bicycles.

ACTIVITIES	Unit	Unit (Nos)	Revenue per unit	Total (INR Lakh)	Remarks/Assumptions
Annual Membership	Nos	1500	1000	15	5 subscribers per bicycle
Casual Membership	Nos	3000	30	0.9	10 subscribers per bicycle
Trip Fees	Trip	32850	10	3.28	5% of trip pay fees, 6 trips per bicycle per day
Advertisement in docking station	Nos	30	60000	18	Advertisement Revenue is per docking station per year
Advertisement in bicycles	Nos	300	1200	3.6	Advertisement Revenue is per bicycle per year
Total Revenue				40.78	







4.4.3 EVALUATION OF PPP MODELS PROPOSED

Each of the proposed PPP models has its own pros and cons, and different models may be suitable in different contexts. The models have been evaluated on a diverse range of parameters to ascertain their viability and a comparative assessment has been made.

4.4.4 CONCLUSION

Following qualitative analysis and evaluation as in above table, PPP models in PBS are likely to find acceptance by all stakeholders as per priorities indicated hereunder: Turnkey, O&M and BOT.

Exhibit 23: Parameter –wise feasibility of PPP models for PBS

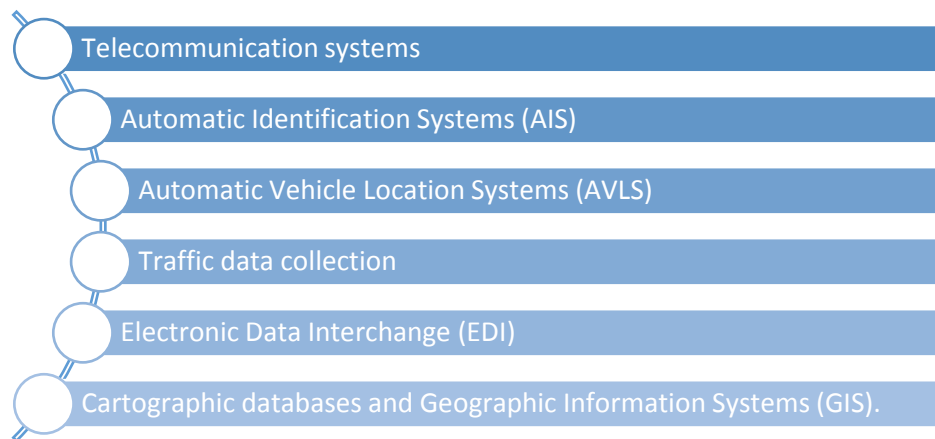
	BOT	O&M model	Turnkey
 Operational efficiency	Medium, since operator’s revenues are directly linked to efficiency of the system, operator would try to minimize cost & increase revenue	Medium, since operator’s revenues are linked with only system performance	High, since the operator is the owner of the system and would try to operate in the most efficient manner
 Investment Requirement	Medium for private proponent, limited investment on the part of the authority	Medium for authority (capex), low for private player (only operational expenses)	Low investment on the part of the authority, private sector brings in resources and expertise
 Access to finance	Difficult, since revenue stream is dependent on uncertain demand, and the operator is bound to operate at fares fixed by the Authority	Easy, since the revenue stream of the private operator is assured in the form of a fixed O&M fee	Difficult, since operator’s revenues are contingent on demand (uncertain)
 Incentives for private player	Low, since the operator’s revenue is dependent on demand, which is highly uncertain and is dependent on supporting infrastructure	High, since the private operator need not assume revenue risk, and is assured of a fixed O&M fee	Medium, since the private operator has freedom to operate the system and tariff fixation and operational planning are within his control
 Project viability	Given the low revenue stream due to uncertain demand and socially driven tariffs, PBS is usually not self sustaining, needs grants	Given the low revenue stream due to uncertain demand and socially driven tariffs, PBS is usually not self sustaining, needs grants	Tariff fixation being under the domain of the private operator who has greater control, viability of this model is relatively higher
 Suitability	When the Authority does not have the financial strength to invest in PBS infrastructure	When the Authority possess the financial strength to assume revenue risk and robust monitoring capacity	When authority wants to leverage global expertise in designing and operating the system

5. INTELLIGENT TRANSPORT SYSTEM

This chapter covers the area of bus based Intelligent Transport Systems (ITS), its emergence in India and the possibilities it offers for PPP opportunities. ITS includes systems in which Information and Communication Technologies are applied in the field of road transport, including infrastructure, vehicles and users, and in traffic management and mobility management, as well as for interfaces with other modes of transport.¹

Commuters in Indian cities face severe problems including infrequent buses, delays, lack of information about different bus routes and stops. Use of ITS applications in city bus operations can lead to increased efficiency in the form of reduced congestion, enhanced and economically viable mobility; increased safety through reduced accidents; faster response for accidents and disasters and for environmental benefits, reduced fuel consumption and emissions, and improved passenger experience through Passenger Information System (PIS) and fare integration. Typically, ITS systems can be categorised in the following main groups of applications:

Exhibit 24: Components of Intelligent Transport System



The concept of ITS in India is relatively new. There are a few metropolitan cities such as New Delhi, Bangalore and Pune that have implemented standalone ITS applications like automated parking systems, electronic toll collection, automated traveller information systems (ATIS) and intelligent signal control. Passenger information systems (PIS) have been implemented in some bus rapid transit (BRT) systems in India.

The scope for ITS implementation in India's urban transport sector, however, is huge. Increase in number of vehicles has added to existing traffic congestion, especially in urban areas. Delhi, Mumbai, Kolkata and Bengaluru have 5% of India's population, but 14% of the total registered vehicles¹⁷ which leads to traffic congestion, deterioration in air quality, and increase in noise levels in the metropolitan cities. Technology based solutions are the need of the hour for solving the transport woes of urban India. Under GoI support, many cities are implementing metro rail, BRT, monorail and other forms of public transport, thus, opening up opportunities in passenger information systems, smart cards and integrated ticketing, and parking management.

¹⁷ http://ebtc.eu/pdf/120913_SNA_Snapshot_Intelligent-transport-systems-in-India.pdf

ITS is also finding mention in NUTP. The National Road Transport Policy (NRTP) of the MoRTH underlines the importance of ITS in the road and highway infrastructure including technologies in real time traffic flow management, parking availability, vehicular traffic, and a basic geographic information system (GIS). The NRTP states that the GoI will promote research and development in the use of ITS for addressing the problems of the transport sector, as well as making vehicle registration Information Technology (IT) based and creating a centralized registry/depository of all information on motorized vehicles.

5.1 PUBLIC-PRIVATE PARTNERSHIPS IN ITS

From an institutional standpoint, all ITS systems have the fundamental issue of deployment – one of infrastructure and the other of technology and equipment. While deployment of infrastructure is largely a public matter, deployment of technology and equipment is often efficiently done from private players². ITS projects are difficult for public sector entities to carry out by themselves, mostly because of their technological complexity and high risks due to the rapidly changing technology.³ For some projects, it may be more optimal for the government to leverage these competencies from the private sector. Hence, ITS offers manifold opportunities for PPP investments.

Case Study: Mysore city-wide ITS Implementation

Mysore has recently become the first Indian city to implement a city-wide integrated network of transportation technologies. The core proposition was to improve the attractiveness of the public transport and gain new users from private transport and retaining existing users.

The core technologies used include:

Vehicle Tracking System	Real Time Passenger Information System
Central Control Station	Geographical Positioning System(GPS)
Electronic Display Systems	Real-time passenger information bus stops and bus stations
Digital Signage System	

- The contract price for the ITS system is INR 14.63 crores.
- KSRTC intends to use the system for advertising and to generate revenues.
- Revenues from advertising on the buses and at the bus terminals will be retained by KSRTC.
- Revenues from advertising at the bus shelters will be shared with Mysore City.
- Scope of the implementation will consist of design, development, testing, **installation, commissioning, training, operations, and management of facilities for a period of three years by the winning bidder. This project is planned to cover 500 Buses, 80 Bus Stops and 2 Bus Terminals**

Till now, in India, PPP projects in ITS involve the city authority designing the system architecture, setting tariff (if any), covering the infrastructure costs and retaining fare box revenue. It engages a private sector player (usually a private ITS service provider) to operate and maintain the system, bring in latest technology, and deploy its staff for providing customer service. The private sector proponent invests in the ITS equipment and gets paid a fixed fee for operating the system. Implementation of PTS projects through PPP mode is also gaining national level focus. The Recommendations of the Working group on the 12th FYP envisage the provisioning, operation and maintenance of ITS through PPP mode.

5.2 KEY BARRIERS

The ITS market is nascent in India and faces a number of challenges. Even though most of the technologies have been successfully implemented in developed nations, there are major hurdles in implementing such state-of-the-art technologies in India, as described below.

5.2.1 POLICY AND INSTITUTIONAL

- **Lack of guidelines focusing on development of ITS:** Given the importance of technology solutions in the Smart Cities Mission of the GoI, coupled with the nascent stage of the ITS industry in India, there is an urgent need to document guidelines on ITS implementation for easy access by Indian cities. Further, necessary amendments in legal framework need to be made with adequate focus on regulated development of ITS particularly in urban transport (including bus operations) and related infrastructure. Model guidelines / policy framework for making choice from out of a set of ITS applications for a particular urban passenger transport system should be laid down by State Governments, so as to provide direction for planned implementation of ITS projects.

5.2.2 PLANNING AND DESIGN

The planning phase of the ITS is critical to the successful implementation of the as a whole. The barriers faced in the planning stage cover technical and financial barriers and are discussed below.

- **Technological obsolescence:** An economic issue with ITS projects is that rapidly changing technology may cause expensive devices to become obsolete in a few years. The field of ITS is growing rapidly and new technologies and innovations are constantly being introduced. Hence, identification of appropriate technology and standards can be complicated and changing technology may change ways to deliver the service.⁴
- **Lack of capacity for optimal choice making/ installation and commissioning of ITS components:** Most ULBs in India lack the required expertise w.r.t various aspects of ITS implementation, including choosing the appropriate technology as well as installation and provision of ITS services in the most optimal manner. This leads to planning complexities, and jeopardizes the success of ITS projects. ULBs may outsource and leverage the expertise of national/ international agencies for this purpose initially, who may subsequently develop model / modular designs / specifications, service quality standards, choice making procedures; operating and maintenance procedures, for use by ULBs.
- **Lack of motivation by private sector due to inadequate sources of revenue generation:** Scope for generation of revenue from application of ITS and its commercial exploitation is limited, and ITS projects traditionally have been cost centers rather than revenue generators. The revenues generated are insufficient to cover even operational costs, and the system life is short due to rapidly changing technology. Further, replacement costs midway are high, while returns are not lucrative. In such a scenario, there is a need to fix, review / revise ITS system's revenue generating means possibly by extending advertisement sites in/ around ITS application sites e.g. in bus shelters / in terminals etc. This will facilitate recovery of all related cost of inputs, including reasonable profitability for investors. Revenue expenditure gap, if any, after commercially exploiting all possible revenue sources, may be made good in the form of budgetary support by the state.

5.2.3 CONTRACTUAL ARRANGEMENT

- **Lack of comprehensive contractual framework:** ITS projects being in the nascent stage in India, there are no comprehensive contractual frameworks readily available for use by city authorities when entering into such projects through PPP mode. Thus, city authorities draft contracts based on their limited expertise and experience, and in the process, important clauses are missed or only partially covered. In the absence of a robust contractual framework, private operators are apprehensive of entering into ITS contracts.

5.2.4 PROJECT IMPLEMENTATION

- **Threat of vandalism/ theft:** ITS equipment are usually installed in public spaces, without round-the-clock manual supervision. The equipment are usually costly and are prone to theft. This makes the operators skeptical of investing in ITS projects, since they are responsible for bringing the equipment at their own cost, and revenue safeguards against such theft/ vandalism of the equipment are usually lacking. In order to incentivize private operators and provide a safe operating environment for them, safeguards against vandalism/ theft / weathering effects etc. of ITS components should be provided in the form of closed spaces at all ITS locations to minimize scope for vandalism/ theft.
- **Lack of existing technological infrastructure:** ITS projects often face an issue with the lack of existing technological infrastructure in the state. As an example, most ITS systems require a high-speed internet connection to be available at all times in the buses. However, this technological infrastructure may not be available, especially in tier-2 and tier-3 cities.
- **High dependence on supporting infrastructure:** The success of an ITS project relies heavily on supporting infrastructure, including appropriate bus design (with applicable sensors), adequate electric power supply, electric wiring, bus mounted units, compatibility of ticket vending machines with on board GPS, robust communication network etc. This leads to project implementation challenges if any one of these supporting infrastructure components are not in place. In India, for example, un-interrupted power supply is a challenge in most cities. A solution around this barrier is planning on-site power generation, wherever needed, using non-conventional energy sources such as solar/ wind power system, as an integral part of the system design and acquisition.

Mysore ITS implementation
The Mysore ITS implementation faced barriers to implementation as the bus drivers lacked confidence in the newly implemented system.

5.3 RECOMMENDATIONS TO ADDRESS BARRIERS

In order to address the above identified barriers, the table below suggests recommendations along with defined action points. If the barriers are plugged in at this initial phase of ITS implementation, it will pave the way for a smooth, integrated ITS in buses, thus enhancing the overall efficiency of the bus system.

Exhibit 25: Barriers to PPP in Intelligent Transport System and corresponding recommendations

Barriers	Suggestive action	Action by	Time period
POLICY & INSTITUTIONAL			
Lack of legal and regulatory framework focusing on management of ITS and utilization of data collected	<ul style="list-style-type: none"> Necessary amendments in legal framework be made with adequate focus on regulated management of ITS and utilization of collected data 	Central and State Government/ ULBs	Medium term
Lack of policy framework and guidelines regarding applicability / choice making from out of full set of applications of ITS in urban transport system / infrastructure	<ul style="list-style-type: none"> Model guidelines / policy framework for making choice from out of a set of ITS applications for a particular urban passenger transport system be laid by State Government Similarly, guidelines for mandated provision for ITS in urban passenger transport infrastructure like traffic signals, bus and metro depots / terminals / stations etc. be laid out. 	State Government	Medium term
PLANNING & DESIGN			
Technological obsolescence – rapidly changing technology causes expensive devices to become obsolete in a few years	<ul style="list-style-type: none"> Contract period for ITS be made to co-terminate with the expected life of the technology, so that the private operator can make a reasonable amount of profit and exit as the technology becomes obsolete. Private operator to keep a futuristic view while choosing technology at the start of the contract period, and choose the most advanced technology available at that time, so as to delay the obsolescence of the technology, to the extent possible. Explore options for upgrade of technology, rather than complete replacement. 		
Lack of demand assessment for ITS, preferably application wise, and their	<ul style="list-style-type: none"> City authority to make assessment of demand for ITS application wise and categorise the same as 	City authority, Private Operator	Short term

Barriers	Suggestive action	Action by	Time period
segregation as Vital / Essential / Desirable (VED) to facilitate ease of choice making by the authority.	VED buses, on board and the urban transport infrastructure of all modes.		
Inadequacy of quality manufacturers/ system integrators / O&M agencies of ITS sub systems / components etc. as applicable to urban passenger transport system/ its sub systems	<ul style="list-style-type: none"> Concerted, planned and dedicated effort by all agencies for developing the said requirements at the earliest 	Private Operator/State Government/ City authority	Medium term
Lack of capacity for optimal choice making / installation and commissioning of ITS sub systems / components in an optimal manner	<ul style="list-style-type: none"> State / ULBs / to out-source services of national / international agencies for the purpose initially; develop model / modular designs / specifications, service quality standards, choice making procedures; operating and maintenance procedures, for use by SPVs / ULBs etc. 	Central/ State Government/ City authority/Private Operator	Medium term
Lack of motivation by private sector due to inadequate sources of revenue generation from applications of ITS and their commercial exploitation; inadequacy of revenues for covering even operational costs; low system life and high replacement cost midway	<ul style="list-style-type: none"> Fix, review / revise ITS system’s revenue generating means possibly by extending advertisement sites in / around ITS application sites e.g. in bus shelters / in terminals etc. to facilitate recovery of all related cost of inputs, including reasonable profitability for investors. Revenue – expenditure gap if any be made good in the form of budgetary support by the state. Identify innovative methods to collect revenue through various mode such as development of mobile apps, improving PIS, Integration with other mode of transport, advertisement on PIS & mobile apps. 	Central and State Government, City authority/ ULB/Private Operator	Continuous process
CONTRACTUAL			
Absence of comprehensive contracts	<ul style="list-style-type: none"> Develop comprehensive model contracts as has been done for bus transport systems by MoUD, GoI to address all issues related to ITS and PPPs. 	Central Government/State Government/SPV	Short term

Barriers	Suggestive action	Action by	Time period
PROJECT IMPLEMENTATION			
Threat of vandalism / theft	<ul style="list-style-type: none"> Safeguards against vandalism / theft / weathering effects etc. of ITS subsystems / components be provided in the form of closed spaces at all ITS locations to minimize scope for vandalism / theft 	City authority	Short term
Inadequacy/ unavailability of power supply at all bus shelters to make ITS operational	<ul style="list-style-type: none"> On-site power generation, where-ever needed, using non- conventional energy sources such as solar / wind power system be planned as an integral part of the system design and acquisition 	City authority	Long term

5.4 GENERATION AND EVALUATION OF PPP MODELS

The activities involved in the entire value chain of ITS development and operation have been detailed out below. Based on the allocation of responsibility for undertaking each of these activities, three types of PPP models have been developed. These models have then been evaluated on several parameters to assess their viability and a comparative assessment has been made.

5.4.1 VALUE CHAIN ACTIVITIES IN ITS DEVELOPMENT AND OPERATIONS

A number of activities are involved in the development and operation of an ITS. The first phase is planning and designing, which involves activities such as finalization of ITS components to be implemented, design and specifications of the system and collaborating with an appropriate telecom/ internet provider. The successive phase is the implementation phase, involving the broad activities of construction of ITS infrastructure, installation of ITS hardware, and set up of a centralized control room. This is followed by the O&M of the system which covers a host of activities to for undertaking the day to day operations of the system. The activities involved in the value chain of ITS development and operation are described below. These have then been assigned to the private player or the public authority, and three PPP models have been developed.

I. PLANNING AND DESIGNING:

Finalization of ITS components: The first activity involved in the planning phase is the finalization of the ITS components to be implemented. ITS can be put to use for a host of purposes such as vehicle location, fare collection, fuel monitoring, information display etc. Before implementing an ITS, the public authority needs to decide which all components of the ITS are to be implemented. It may choose to roll out several components at the same time, or it may choose a phased approach to ITS implementation. The latter case could imply that the authority chooses to implement only Automatic Fare Collection System in the first phase, followed by Automatic Vehicle Location System and Passenger Information System components subsequently.

Design and specifications: Once the components that are to be implemented have been finalized, the specifications of each of these components need to be detailed out. This could include the type of the smart card, specifications of LED screens for information display, and details on the exact information to be displayed.

Collaboration with telecom/ internet provider: For the implementation of any ITS system, a key component is the transmission layer, i.e. the network through which data flows from the point of capture to the point of display. Uninterrupted telecom/ internet services play a crucial role in the success or failure of an ITS. A competent telecom/ internet service provider needs to be partnered with.

II. IMPLEMENTATION

Construction of ITS infrastructure: The first activity in the development of an ITS is the construction of ITS infrastructure. This includes construction of a centralized control room, which would serve as the central point for receiving data captured by the sensors or reception devices. Passenger information to be displayed at various display screens would also be processed from this control room.

Installation of ITS hardware: This involves installing the hardware required for operating the ITS, such as LED screens, computers and related equipment of the control room, detectors/RFID tags inside vehicles, automated fare collection devices etc.

III. OPERATIONS AND MANAGEMENT

Operation of control room: Operation of the control room is an activity that would need to be appropriately assigned either to the public authority or to the private operator. While the operation of the control room may be performed by either party, depending on the type of PPP model adopted, it is recommended that the public authority retains overall control of the data for analysis and subsequent use in route planning etc.

Operation of Automatic Vehicle Location System (AVLS): AVLS uses a combination of GPS and GPRS to transmit the location of a vehicle to the control centre. It is used to track the location of a vehicle, the speed of the vehicle, adherence to schedules and unscheduled stoppages, if any.

Operation of Passenger Information System (PIS): Real time provision of dynamic information to passengers goes a long way in increasing the preference of commuters towards public transport modes. Certainty and information regarding the expected arrival time of a bus helps commuters plan their travel better. This system uses AVLS to disseminate real time information to commuters. Information displayed could include predictions about arrival and departure time, information of schedule disruptions etc. The information could be made available through LED screens at bus stops/ inside buses / through mobile applications.

Operation of Automated Fare Collection System (AFCS): AFCS aids in enabling cashless transactions and the data captured in terms of ridership (both spatial and temporal) can be used for trend analysis and route planning of the public transport system. It reduces leakages in the fare collection system and is an integral step in achieving multi-modal integration.

5.4.2 PPP MODELS IN BUS TERMINAL DEVELOPMENT AND OPERATIONS

Based on the allocation of responsibilities for the various identified activities in the value chain of ITS development and operation, the following three types of PPP models have been developed:

1. Composite O&M model
2. Multiple operator O&M model
3. BOT model

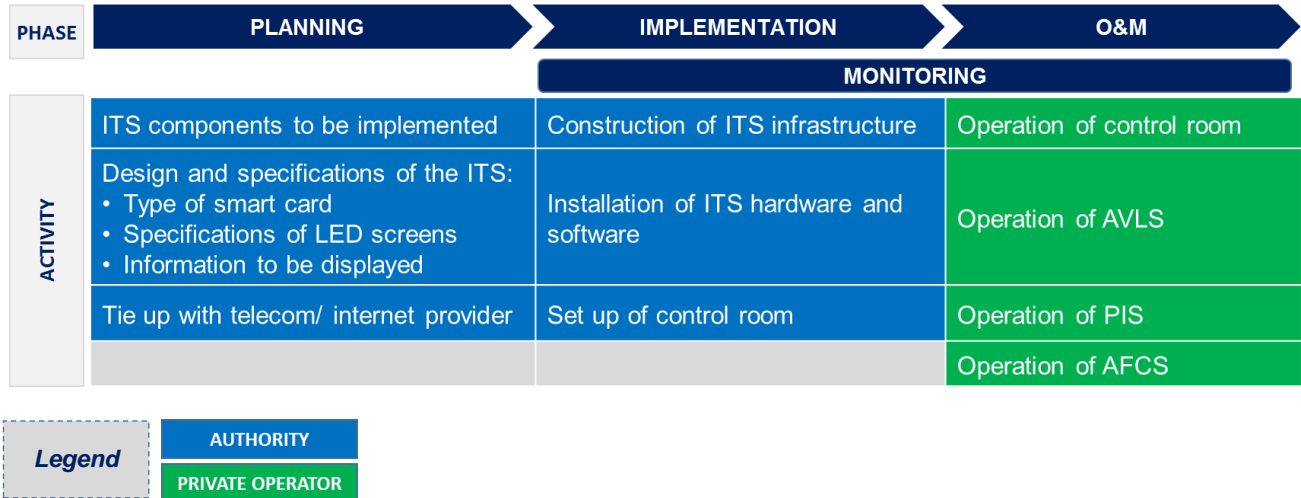
I. COMPOSITE O&M MODEL

Under this model, the public authority plans the entire ITS, and decides on the components to be implemented. The public authority also collaborates with a competent telecom/ internet service provider for providing the transmission network. It also decides the design and specifications of various ITS components, such as the LED screens, the exact information to be displayed, the type of reception devices to be installed in vehicles etc. It then engages a competent private ITS operator to operate the system for the contract period, post which the authority invites fresh bids and a new operator is engaged. Bidding parameter: Least cost quoted for ITS operation.

RESPONSIBILITY ALLOCATION

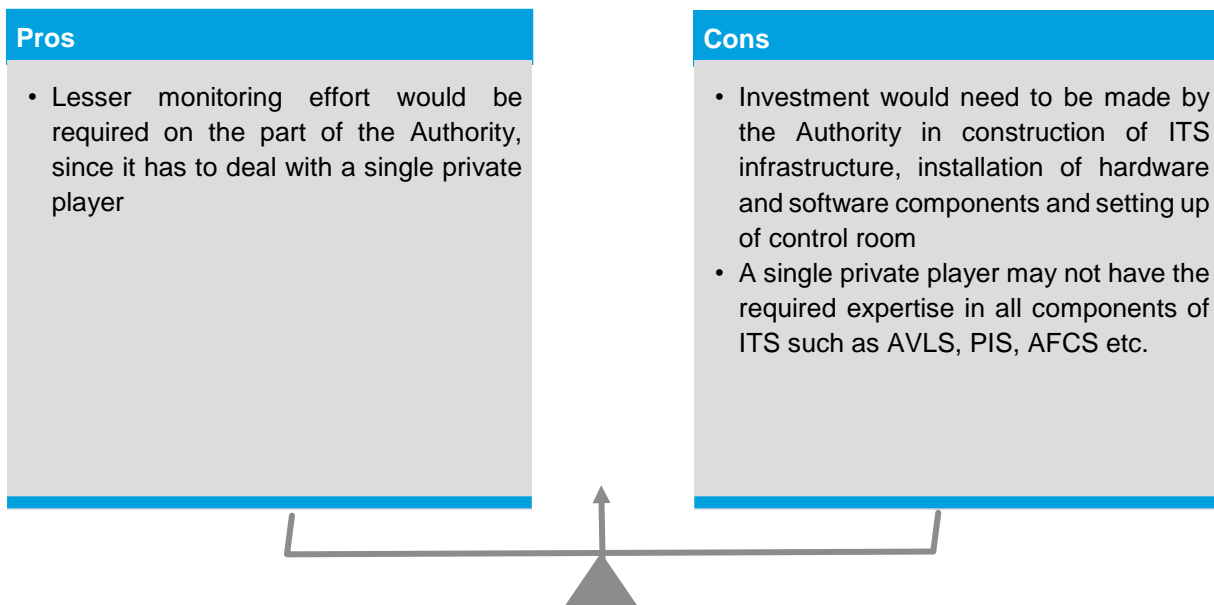
The division of responsibility between the public authority and the private player under the composite O&M model is provided below.

Exhibit 26: Responsibility Allocation under composite O&M model



PROS AND CONS

The pros and cons of the composite O&M model are listed below.



II. MULTIPLE OPERATOR O&M MODEL

Under this model, the public authority plans the entire ITS, and decides on the components to be implemented. The public authority also collaborates with a competent telecom/ internet service provider for providing the transmission network. It also decides the design and specifications of various ITS components, such as the LED screens, the exact information to be displayed, the type of reception devices to be installed in vehicles, and constructs/ provides the ITS infrastructure, providing hardware and software components. It then engages multiple competent private ITS operators for operation and management of the different components of ITS to be implemented. The private operators operate the various components of the system for the contract period, post which the authority invites fresh bids and new operators are engaged. Under this model, each activity in ITS development and operation (AVLS, PIS, AFCS etc.) is outsourced separately to private operators. Revenue accrues to the Authority, and the private operators get paid a fixed pre decided fee. Bidding parameter: Least cost quoted for each activity separately.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under this model is provided below.

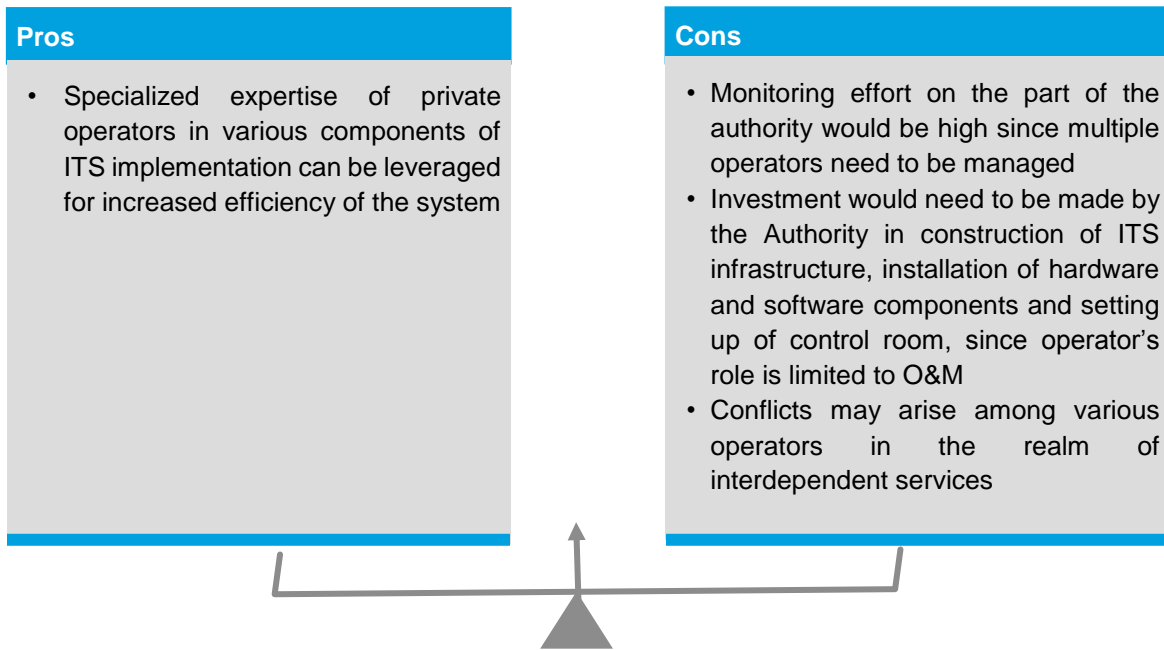
Exhibit 27: Responsibility Allocation under multiple operator O&M model

PHASE	PLANNING	IMPLEMENTATION	O&M
		MONITORING	
ACTIVITY	ITS components to be implemented	Construction of ITS infrastructure	Operation of control room (Pvt Op – 1)
	Design and specifications of the ITS: • Type of smart card • Specifications of LED screens • Information to be displayed	Installation of ITS hardware and software	Operation of AVLS (Pvt Op – 2)
	Tie up with telecom/ internet provider	Set up of control room	Operation of PIS (Pvt Op – 3)
			Operation of AFCS (Pvt Op – 4)

Legend	AUTHORITY
	PRIVATE OPERATOR

PROS AND CONS

The pros and cons of the multiple operator O&M model are depicted in the adjoining diagram.



III. BOT CONTRACT

Under this model, the public authority plans the entire system, and decides on the ITS components to be implemented. The public authority also collaborates with a competent telecom/ internet service provider for providing the transmission network. It also decides the design and specifications of various ITS components, such as the LED screens, the exact information to be displayed, the type of reception devices to be installed in vehicles. It then engages a competent private ITS operator to constructs the ITS infrastructure, including hardware components. The private operator also operates the entire system for the contract period, post which the authority invites fresh bids and a new operator is engaged. Revenue accrues to the private operator, and all investments are made by the private operator. The public authority pays/ receives a system management fee. The *bidding parameter* is the system management fee.

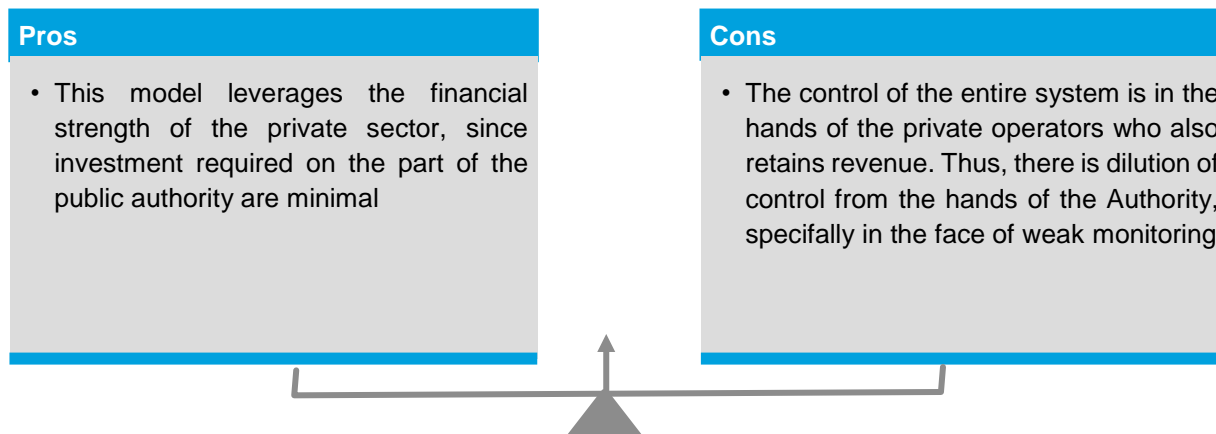
RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under this model is provided below.

Exhibit 28: Responsibility Allocation under BOT contract model

PHASE	PLANNING	IMPLEMENTATION	O&M
		MONITORING	
ACTIVITY	ITS components to be implemented	Construction of ITS infrastructure	Operation of control room
	Design and specifications of the ITS: • Type of smart card • Specifications of LED screens • Information to be displayed	Installation of ITS hardware and software	Operation of AVLS
	Tie up with telecom/ internet provider	Set up of control room	Operation of PIS
			Operation of AFCS
Legend	AUTHORITY	PRIVATE OPERATOR	

PROS AND CONS



FINANCIAL ASSESSMENT

Capital cost estimates: The below cost estimates are provided for ITS in a passenger transport system:

Capital and operational costs of an ITS system can best be assessed for a given set of requirements of ITS depending upon fleet size , operational areas, bus transport operations and maintenance infrastructure like depots, terminals, bus stops, control room etc. Size / quantum of ITS facilities / equipment / components would accordingly be planned and acquired though certain basic facilities have to be available for making the system functional irrespective of fleet size, etc. Capital costs and operational costs would vary according to system characteristics and would make it difficult to hazard a guess in its absence. However, to make an assessment costs involved in Mysore ITS project of KSRTC are considered as base. An escalation factor of about 15% is applied on these costs to bring them to current levels.

- **Scope of an ITS project consists of :**
 - ✓ design, development, testing, installation, commissioning, training, operations, and management of facilities
 - ✓ for a period of 3 years by the contractor.
 - ✓ This project covers 500 Buses, 80 Bus Stops and 2 Bus Terminals.
- Total capital and operational cost of the project at current level works out to Rs 14.63 *1.15 = Rs 16.82 crores

Operation & maintenance estimates: This cost for a period of three years is included in the total project cost of Rs.16.82 crores.

Revenue estimates: The revenue estimates are provided for the revenues arising from various sources on the street infrastructure.

SOURCE	Facilities		Display system		Advertisement revenue per month (Rs)		Remarks / assumptions
	Unit	Quantity	Units	Quantum per month	Rate per unit Rs	Revenue	
Bus shelters alternating with PIS. Size of each display system	Nos.	80	Time in hrs	80 *6*30 *0.85 =12240	10	1,22,400	<ul style="list-style-type: none"> • 1 display unit per bus shelter, • Advertisement display time of 6 hrs daily i.e.







SOURCE	Facilities		Display system	Advertisement revenue per month (Rs)		Remarks / assumptions	
:800mm 200mm *						@50% of bus operational span of 12 hrs. Utilization factor for ads assumed as 0.85	
Terminals alternating with PIS	Nos.	2	Time in hrs	= $2*30*6*0.85*30+(2*2*25)*(12*0.25*0.85*30) =16830$	10	1,68,300	<ul style="list-style-type: none"> 1 terminal is assumed to cater to about 250 buses daily, each bus making 6 trips with average dwell time of 15 minutes in terminal. Nearly 30 bus shelters required and are available for ads display on PIS boards. At least at 2 places there are 2Mtr*2 Mtr PIS display boards; Each display board would be equivalent to = $(2*2)/(0.8*0.2)=25$ BQS display boards. Available for 25% of operational span of 12 hrs for display of ads
Buses - PIS display system on-board for travelling pax. Ads include dynamic messaging displayed for 50% of operational time span of 12 hrs daily	Nos.	500	Time in Hrs	= $500*0.90*12*0.5*0.85*30=68850$	10	=6,88,500	<ul style="list-style-type: none"> Size of each display system on board is taken same as that at the bus queue shelter (BQS) Assumed 90% fleet utilization and 85% as display system utilization; operational span of 12 hrs daily and Ads display time of

SOURCE	Facilities		Display system		Advertisement revenue per month (Rs)		Remarks assumptions /	
							50%	of operational time
Total revenue per month						9,79,200		
Total revenue in 3 yrs						3,52,51,200		
As against the project expenditure of about R 16.82 crores, revenue from advertisement is Rs 3.56 crores, making the financially unviable.								

5.4.3 EVALUATION OF PPP MODELS PROPOSED

Each of the proposed PPP models has its own pros and cons, and different models may be suitable in different contexts. The models have been evaluated on the following paramters to ascertain their viability and a comparative assessment has been made.

Exhibit 29: Parameter –wise feasibility of PPP models for ITS

	Composite O&M	Multiple operator O&M	BOT
 Operational efficiency	High, since a single operator would be able to provide an integrated set of services and ensure system efficiency	Could be hampered due to multiple operators operating various components of the system	High, since the operator provides hardware and software components and also manages operations, operational control enables efficiency
 Investment Requirement	High on the part of the Authority, which needs to invest in hardware as well as software components	High on the part of the Authority, which needs to invest in hardware as well as software components	High on the part of the private operator, who invests in the entire system
 Access to finance	Easy, since investment by the private player is minimal and it gets paid a fixed monthly fee	Easy, since the private operators do not invest in the hardware and software and fixed revenue	Difficult, since the project is not self-sustainability and revenue streams are insufficient
 Incentives for private player	Medium, since the private operator is governed by the hardware and software provided by the Authority, with limited autonomy	Low, since each operator gets only a small part of the service delivery	High, since the operator has control of the entire system, and can choose the appropriate hardware and software for most efficient operations
 Project viability	Project not self-sustainable, would need extensive provision of advertisement spots as well as budgetary funding support	Project not self-sustainable, would need extensive provision of advertisement spots as well as budgetary funding support	Project not self-sustainable, would need extensive provision of advertisement spots as well as budgetary funding support
 Suitability	When the authority wishes to enable an integrated system and has limited monitoring capacity	When the authority has the capacity to monitor multiple operators	When the authority is not financially strong enough to invest in the hardware and software components of the technology

5.4.4 CONCLUSION

Following evaluation of different PPP models for ITS in bus based systems, it emerges that none of the systems is financially viable (self-sustaining) on its own though they are technically feasible. However, financial viability may be increased by provided additional advertisement spaces to the private proponent. On specifying a fixed number of such additional spaces for revenue generation by way of advertisements, system management fee may be specified as the bidding parameter. Considering all aspects of evaluation and need for highest operational efficiency of the system besides minimum need for monitoring and control by the authority, selection out of various PPP models may be made in following order of preference: Composite O&M, BOT, activity wise contract.

6. CITY BUS PRIVATE OPERATION

City bus transport has been identified as a vital lifeline supporting the growth of an economy. A well-planned and integrated transportation system acts as an efficient facilitator to the development of regional, economic and social activity. City bus transport needs to be efficient and affordable for maximizing its use, and at the same time, must generate sufficient revenues for its financial sustainability to continually service the ever expanding travel demand.

Before independence, passenger road transport operations in India were in the hands of private operators, but shortly after independence, the nation embarked on a policy of nationalizing passenger transport. The Parliament enacted the Road Transport Corporation Act in 1950. In the wake of this, various State Governments had set up SRTCs/ SRTUs. Since then, STUs have continued to dominate the public road transport sector. However, their priorities are set towards inter-state and inter-city operations and in most cases city bus operations have taken a backseat.

At the same time, post liberalization, India has made rapid economic progress, leading to widespread urbanisation, placing tremendous pressure on the urban infrastructure, especially the road system and mobility networks. Public transport systems in cities have not, however, been able to keep pace with the rapid surge in demand. Furthermore, in medium and small size cities, fleet availability with STUs has steadily declined with a sharp decline in patronage. Few cities like Bangalore, Mumbai and Delhi have city level SPVs/organizations to provide city bus transport services. The JnNURM launched by the GoI in 2005, offered support for creation of bus transport infrastructure in select cities in the country, stimulating the priority for providing city bus systems. JnNURM and AMRUT inter alia envisaged a number of reforms at the city and state levels for achieving effective, efficient and sustainable development of urban infrastructure including that of urban public transport system. As a result, ULBs in many Indian cities have started using PPP models in order to quickly establish bus transport systems.

6.1 PUBLIC PRIVATE PARTNERSHIP IN CITY BUS PRIVATE OPERATION

As a result of various policy initiatives mentioned above, cities have undertaken steps to improve mobility - city bus operations on PPP being the most prevalent project. The public sector is responsible for planning, designing, identification of routes, fixing of fares, overall supervision and monitoring of the project. The private sector proponent (refers to private bus operators) provides bus service within the city in accordance with a fleet deployment plan on specified routes and frequency. Depending upon the project structure, the private sector proponent either retains fare box revenue or receives a per km O&M fee from the authority. In all the city bus PPP projects, operations and maintenance of buses is the private sector proponent's responsibility, and other components vary depending upon the city-specific requirements such as procurement of fleet, operation and maintenance of depot, collection of fare box revenue etc.

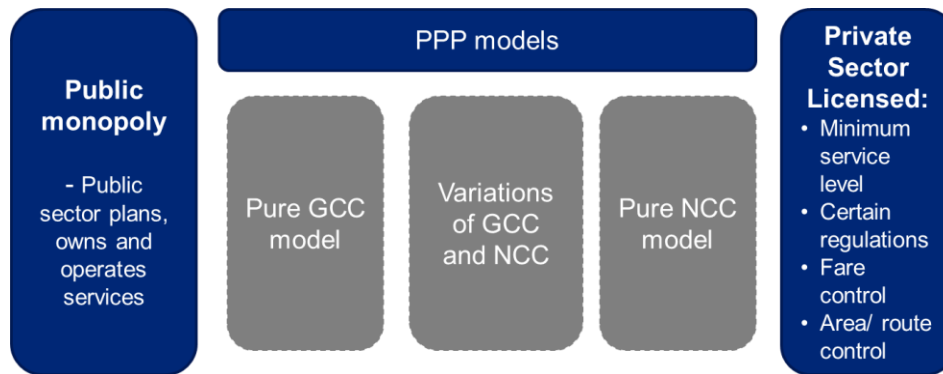
Trend in City Bus Operation PPPs in India

City bus private operations have been undertaken across several cities in India including Delhi, Bhopal, Indore, Ahmedabad, Jaipur, Jalandhar, Amritsar, etc. Both GCC and NCC models are prevalent across Indian cities, however, the recent trend indicates a preference towards the GG model, with the public authorities assuming the revenue risk.

Between the two extremes of public monopoly and private sector licensing, two broad forms of contracting mechanism are identified: a Gross Cost Contract (GCC) model and a Net Cost Contract (NCC) model. These two contract types emerge on the basis of allocation of revenue

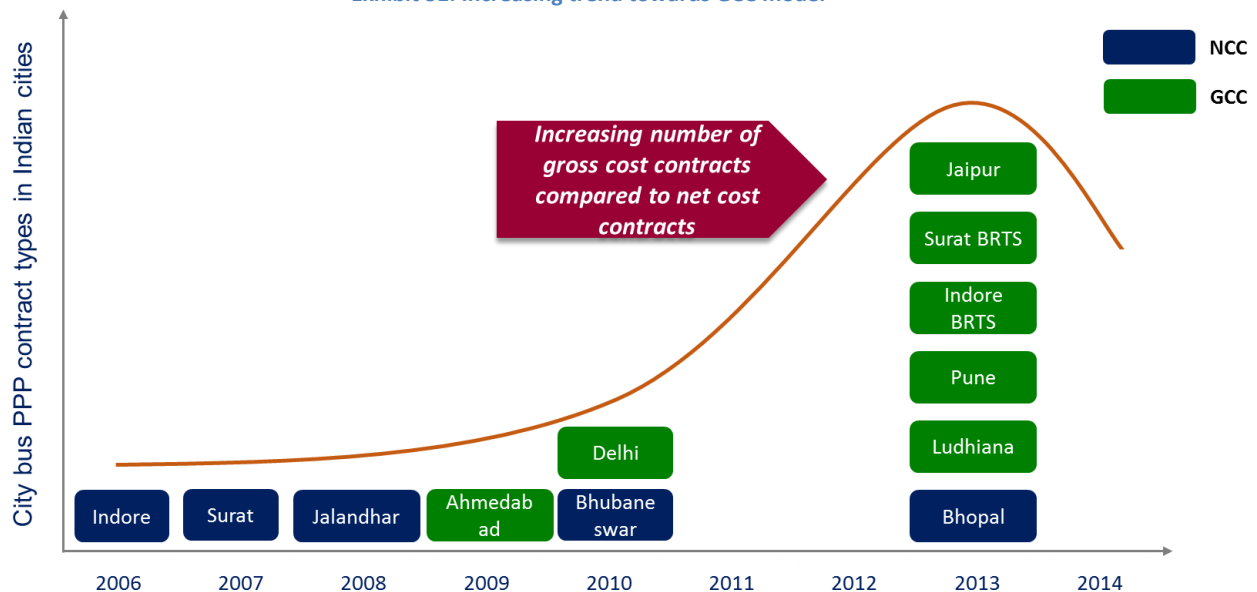
risk between the public and private sector. Under a GCC model, the public authority assumes the revenue risk and pays a fixed premium to the private operator periodically to provide services, while under NCC model, the public authority provides infrastructure and the private operator undertakes operation, maintenance and revenue collection activities, retains fare box revenue and bears the revenue risk in providing bus transport services. In addition to these, hybrid forms of contracting could also be implemented. Examples of hybrid forms of contracting can be drawn from the bus operations in Germany and Sweden, wherein GCC contracts with an incentive to increase ridership are implemented. The below exhibit presents range of possible PPP options for city bus operations.

Exhibit 30: Possible range of contract models in city bus operations



Both NCC and GCC models have been implemented in city bus operations across Indian cities, depending on the specific context of the cities. While cities like Delhi, Ahmedabad and Ludhiana have implemented the GCC model, Bhopal and Indore have chosen the NCC model for city bus private operations. A general preference towards GCC has emerged over the last decade, primarily due to high risks on the private operators in the NCC model with less than expected return on investment.

Exhibit 31: Increasing trend towards GCC model



Indore - BRTS (GCC) and City Bus Operations (NCC)

In Indore, Atal Indore City Transport Services Limited (AICTSL) is the SPV responsible for bus operations. For its city bus services, the city adopted an NCC model, while for its BRTS, a GCC model was adopted. Infrastructure facilities (bus stops, depots, corridors) under both models are provided by the authority. Contract period is 5 years, with a provision for extension upto 3 years (city bus) and 2 years (BRTS). Under the NCC model for city bus operations, the fleet is procured and owned by the private operator(s), while under the GCC model for BRTS, the fleet is procured and owned by the authority, with the cost being shared by the authority and the private operator. Under the BRTS model, the operator is paid a fixed amount for minimum assured kilometres and incentives exist for the operator to perform in the long run, since renewal of the contract is linked to performance.

Internationally, a mix of net cost and gross cost models has been implemented, and variations of these models have also been experimented with. While London and Adelaide have implemented gross cost contracts (fixed monthly payments) or its variations, the city of Quito operates its city bus services through the NCC model. Santiago has an intermediate contract between gross and net cost contract, where the authorities and the operator share the extra fare box revenue (50/50) and publicity revenue (70/30). This is a 10 years contract and the contract can be extended if the operator meets requirements regarding development in demand (passenger-km), and development in quality index (perceived and realised quality). Each city has undergone a period of reform, and has adopted the model best suited to its requirements.

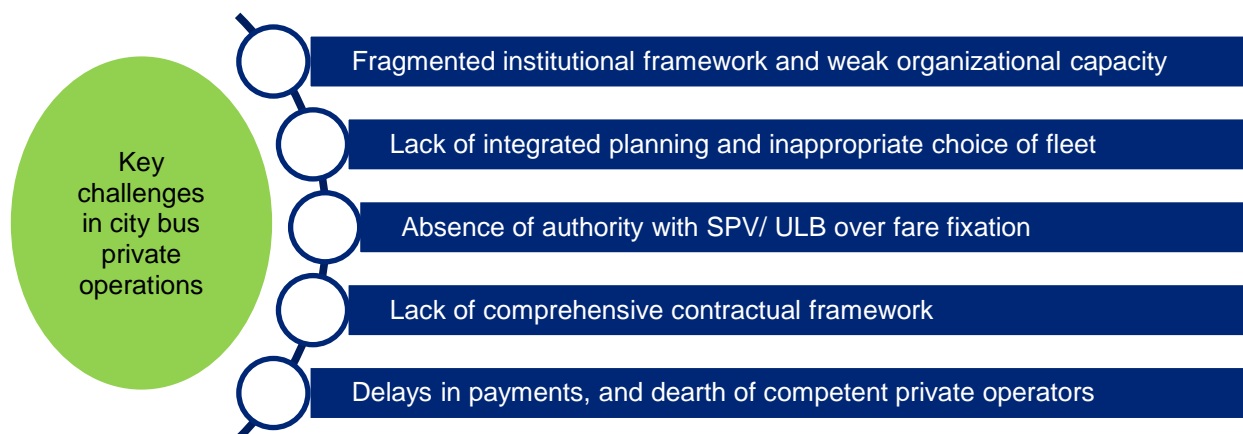
London Quality Incentive Contracts (QICs)

Burdened by the pressure on government budgets and driven by the desire to improve service quality over cost saving, Transport for London (TfL) was established and Quality Incentive Contracts (QICs) were introduced in London in 2001. These replaced the conventional Gross Cost and Net Cost contracts, both of which had their inherent challenges. A development over the previous contracts, these QICs offer direct financial incentives for operators linked to the quality of service. The contracts are an extension of the gross cost model wherein TfL retains the revenue. The operators are paid monthly with annual bonus payments for meeting quality parameters. Under the traditional GCC model, while operators are required to comply with the Minimum Performance Standard (MPS), there is no financial incentive to achieve those targets. This gap is fixed in the QIC model, which incentivizes operators to meet quality parameters.

6.2 KEY BARRIERS

While the city bus private operations initiatives have been implemented with success, the sector requires additional actions and impetus to ensure effective implementation of project on PPP. These projects have been experiencing difficulties due to lack of business planning, well-designed contractual frameworks, and weak institutional frameworks, limited availability of private players. The challenges have been broadly divided into institutional, planning, contractual arrangement and project implementation. Some of the key challenges have been listed in the exhibit below and they have been further detailed in this section.

Exhibit 32: Key challenges in city bus private operations



6.2.1 POLICY AND INSTITUTIONAL

- **Fragmented institutional framework:**

Institutional framework for provision of city bus services in India is highly fragmented. Multiple agencies are involved in planning and implementation of city bus transport projects, leading to disjointed planning, due to which, essential bus transport infrastructure is not ready and available in time. This results in higher cost of operation and financial loss for the private sector proponent and hampers the feasibility of PPP projects. Further, even in cities where dedicated SPVs have been created for operating city bus services, different aspects of the bus system are under the control of different authorities. For example, issue of permits/ licenses is usually the responsibility of the Transport Department, while the fixation of passenger fares is under the ambit of the Fare Fixation Committee constituted by the state government. In an ideal scenario, the agency that is responsible for bus operations and is assuming the revenue risk, must be able to control fares.

Bhopal UMTA – Integrated authority for urban transport

The city of Bhopal has proposed to set up an UMTA, which would be vested with a range of powers related to delivery of urban transport services. These include route rationalization and fare fixation, with the underlying logic that the authority that is responsible for delivering services must also be empowered to decide on fares.

- **Weak organizational capacity:** In most of the cities, PPP projects for city bus private operations are undertaken by SPVs. Though the constitution of SPV varies from city to city, usually it has representation from ULBs, district administration, development authority, traffic police and other stakeholders. However, in other cities it is undertaken by ULBs directly. Managing an efficient public transport system requires adequate number of qualified and experienced employees for planning, contract management, daily interaction with the private sector proponent, and monitoring the performance of the private operator(s). The staff should have relevant technical know-how of bus operations. However, it has been observed that most SPVs/ULBs are grossly understaffed and lack the relevant technical skills.

This weak organizational capacity of ULBs leads to poor management and creates inefficiencies in the system.

6.2.2 PLANNING AND DESIGN

Planning is an important step that is usually ignored before initiating city bus service. It is crucial that there is clarity, at the very outset, on the bus transport objectives before embarking upon the initiation or re-organization of bus transport. Authorities must chalk out a clear road map (a strategic plan) for an improved, efficient and financially sustainable bus transport system. The planning section has been divided into two parts – technical and financial. The key barriers for each of these parts are provided below.

Technical

- **Lack of integrated planning:** City bus services must be integrated with other transport modes in a manner that they complement the other modes, instead of having excess overlap and resulting in wasteful competition. For example, if metro rail connects points A to B within a city and it suffices the travel demand along this route, bus services may be operated to transport passengers from B to C, rather than running along the same route and leading to inefficient operations. Similarly, intermediate para transit modes should complement the bus services, by ensuring last mile connectivity, rather than leading to duplication by operating on the same routes as the buses. While competition with other modes is important to offer choice of travel to the citizens, it must not lead to needless duplication. However, in many Indian cities, planning and integration with other modes is limited, and there is no rationalization of modes. As a result, services overlap, gaps exist, and some services are underutilized.
- **Inappropriate choice of fleet:** The type of bus fleet (type, capacity, design) to be operated in a city has a huge impact on the success of the bus system. A thorough assessment of the city's requirements is a prerequisite for procurement of appropriate type of buses. In some cases, buses have been procured by a city without any prior assessment of the city's requirements. As a result, the buses have not been used, resulting in heavy financial losses to the city. For guidelines on fleet selection, PPIAF/World Bank Urban Bus toolkit and technical specifications of buses issued by MoUD, GoI¹⁸ may be referred to.

Financial

- **SPV/ ULB/ private operator has no authority over revising fare structures, even though it takes the financial risk arising out of the project:** Fare box revenue is the main source of revenue and essential for financial sustenance of the project. The financial implication/risk of the project lies with the SPV/ULB. However, neither of them has the power to revise fare structure. Similarly they do not have the power to decide routes and issue route permits. Also, the fare revision is on historical rates and is often infrequent. This severely impacts the sustainability of the project particularly when revenue risk is borne by private sector proponent.

¹⁸ *Recommendatory Urban Bus Specifications – II issued in April 2013*

- **Absence of dedicated fund for financing projects:** At times, absence of dedicated funding discourages private sector proponent from investing in city bus projects. Lack of a dedicated fund for such projects threatens the financial sustainability of the project, given the socially driven fare box revenue. City bus operations attract reluctance from bankers in lending money, since fare box revenues are often insufficient to make the projects viable.

Surat: First Indian city to set up UTF

Surat is the first city in India to have set up a dedicated urban transport fund. Lack of public transport system in the city had led to a phenomenal increase in the usage of personal vehicles. To reverse this trend, the city government finalized a CMP, an important component of which is urban transport. To meet the humungous budgetary needs and the objective of NUTP, the Surat Municipal Corporation set up a dedicated urban transport fund. The fund has been created through budgetary allocations and its revenue components include vehicle tax, parking charges, and license fee for advertisement rights.

6.2.3 CONTRACTUAL ARRANGEMENT

- **Lack of comprehensive contractual framework:** As PPP based contracting for city bus operations is a recent trend in India, most Indian cities do not have comprehensive contractual frameworks necessary for a robust PPP contract. Important clauses such as conditions precedent, comprehensive monitoring framework, quantitative measurement of performance, well-defined payment mechanisms etc. are lacking in the contractual frameworks. Also, contracts lack the proper incentives and motivators to influence the behaviour, responsibility and obligations on each contracted party. In most contracts, 'dead kilometres' are poorly accounted for and are left as an incomplete issue. Moreover, compensation against damages arising out of vandalism is missing from most contracts. In case of damage to the fleet due to causes beyond the control of a private operator (e.g. riots), the responsibility for rectification of damages is covered only in the contracts for Ahmedabad city and Ludhiana. Penalty mechanisms in most contracts do not allow for operator's explanation to faults. Moreover, penalties are discretionary and qualitative, that leads to dispute between the parties. Also, many contracts do not provide for change of scope, making them rigid and often impacting the financial viability of the project.

6.2.4 PROJECT IMPLEMENTATION

In this section, challenges faced after signing of contract for effective implementation of city bus operation projects on PPP have been discussed.

- **Delay in infrastructure handover and payment to private sector proponent increases cost of operations:** Delay in payment is a very common occurrence and an area of grave concern for the private sector operator. It increases the amount of working capital required for the project and reduces the private sector proponent's return on investment. For city bus private operations, land is required for parking and maintaining buses. In many instances, either land for parking and bus depot is not handed over to private sector proponent in time or the depot and parking are not adequately constructed and equipped for effective implementation of the project. When buses are parked on-street it increases the risk of theft, damage, vandalism etc. that in turn increase the cost of operations. This has a direct impact on the operating cost of the project and in-turn do not weed out inefficiencies from the system. At times bus depots are not provided with utility connections such as water supply, electricity, sewerage etc. Provision of utility connections is usually the responsibility

of the authority. If utility connections are not available, then the private sector proponent is not able to provide clean buses, and in turn, is penalized for the same.

- **Dearth of private operators:** Experienced private bus operators are limited in India, and thus, when a city decides to implement city bus operations through the PPP mode, it often attracts very few bids. Part of the lukewarm response could be attributed to the contractual provisions not being accepted by the private operators, however, the main reason is the presence of limited competent operators. Most operators are small scale operators, lacking the capacity to carry out zone-wide or city-wide operations.
- **Inadequate capacity for monitoring and control:** Due to limited application of advanced technology such as ITS and limited capacity of the public sector, monitoring and control of bus services poses a significant challenge for the city authority. The city authorities, in most cases, lack the technically competent and adequate staff to ensure monitoring of bus operations across the entire city. Moreover, the application of ITS in buses is very low at present. For example, imposition of penalties should ideally be backed by ITS supported evidence of the fault, in order to remove the discretionary aspect from it. However, this is not implemented in most cities, thus leading to ambiguity and disputes.

6.3 RECOMMENDATIONS TO ADDRESS BARRIERS

Having identified the barriers above, this section provides suggestive actions to address those barriers. In order to enable successful implementation of PPP projects in city bus operations, a facilitating environment needs to be created for the private player. The key recommendations to make PPP arrangements in city bus projects successful are captured in the table below.

Exhibit 33: Barriers to PPP in City Bus Operations and corresponding recommendations

Barriers	Suggestive Actions	Action by	Time period*
POLICY AND INSTITUTIONAL			
Fragmented institutional framework	<ul style="list-style-type: none"> • Development of an institutional set up sufficiently empowered to effectively coordinate with all agencies involved in obtaining a sustainable bus transport system in the city and capable of providing “one-stop solution” to most of the related issues, mainly with respect to: <ul style="list-style-type: none"> ◦ Integrating public transport network and firming up modal shares ◦ Bus transport infrastructure - planning, acquisition, designing, development and commissioning of ◦ Bus operations permits - Issue and or arrange to issue ◦ User tariffs - Fix, structure, review and or arrange to do so in time ◦ Funds Provisioning – for capital and working capital requirement; funding - viability gap, socially relevant but uneconomical operations, Concessional user tariffs, etc.; Drawing rights from dedicated urban Transport Fund in absence of any or all of above. ◦ Human resources and capacity building – Planning, induction, training, career progression etc. ◦ All other functions, obligations, rights – generally as per RTC Act 1950 • Creation of a unified authority at the city level to ensure a robust institutional framework comprising 	State Government/ ULB	Medium term

*Short term: upto 1 year, Medium term: 1 to 3 years, Long term: more than 3 years

Barriers	Suggestive Actions	Action by	Time period*
	representatives from various transport bodies including inter-alia: <ul style="list-style-type: none"> ○ State Transport Department ○ City bus SPV ○ Municipal corporation ○ Development authority ○ Urban Development Department ○ Public Works Department ○ Ministry of Urban Development, Government of India ○ Transport experts from the private sector ○ Representatives of civil society 		
Weak organizational capacity to undertake: <ul style="list-style-type: none"> • demand assessment – spatial and temporal, • network planning, route structuring, operations scheduling, etc.; • specifying bus technology and selection from out of alternatives; • repair and maintenance systems and facilities planning; • setting service level benchmarks; • monitoring and control of bus transport systems 	<ul style="list-style-type: none"> • SPV/ ULB to have in-house resources to outsource such activities through a transparent and competitive process, by setting out requirements, preparing RFPs, managing bidding process, selection of capable agency(ies), monitoring and control of quality and time-lines of deliverables. • Enhance capacity of existing officials through trainings programmes • SPV /ULB may acquire services of Project Management Consultants to supplement in-house capability 	City authority/ City bus SPV	Short term
PLANNING AND DESIGN			
Lack of comprehensive and integrated planning	<ul style="list-style-type: none"> • A single entity in a city (a bus SPV) must be given complete charge of bus operations in the city • UMTAs must be formed at the city level for efficient transport planning 	City authority	Medium term

Barriers	Suggestive Actions	Action by	Time period*
	<ul style="list-style-type: none"> CMP to be prepared for all cities 		
Inappropriate choice of fleet	<ul style="list-style-type: none"> Detailed assessment of a city’s requirements to be carried out before procuring fleet 	City authority/ City bus SPV	Medium term
SPV/ULB/Private sector proponent has no authority over revising fare structures, even though it takes the financial risk arising out of the project	<ul style="list-style-type: none"> SPV / ULB be empowered to fix, structure, review /revise user fares, on the basis of cost of inputs at predetermined periodicity and/or arrange to get the same done; plan for budgeting for revenue loss on account of operating socially relevant but uneconomic services; fare concessions extended to various categories of passengers; loss of revenue for reasons other than those based on poor performance; delays in revision / review of fares, etc. 	State Government	Medium term
Absence of dedicated fund for financing projects	<ul style="list-style-type: none"> Creation of an Urban Transport Fund at the city level to finance city bus operations, managed by the city-level UMTA or any other ULB, as the case may be. 	State Government	Medium term
CONTRACTUAL ARRANGEMENT			
Lack of comprehensive contractual framework	<ul style="list-style-type: none"> Model contract agreements drafted by the MoUD to be made available to all cities so as to assist them in developing comprehensive contracts Guidelines for optimal use / selection of applicable options / clauses form an integral part of above model contract agreements Conditions precedent clause must include all conditions to be fulfilled by the authority to enable the operator to smoothly carry out operations Such clauses must be comprehensive, and must be drafted with inputs from the operator Cost for “dead kilometers” clearly defined at RFP stage itself including assignment of cost for dead 	City Authority/SPV/MoUD	Short term

Barriers	Suggestive Actions	Action by	Time period*
	<p>kilometers to an entity, and the clause for the same be clearly defined in the contracts.</p> <ul style="list-style-type: none"> • Since vandalism is an event beyond the control of the operator, authority to duly compensate the operator for losses on account of vandalism, and compensation mechanism to be clearly defined in the contract • Operators be made 'partners' in the system, and an arbitration must be conducted before imposing the penalty • Contracts should be drafted in a manner that incorporates scope for change due to circumstances beyond the control of the two parties 		
PROJECT IMPLEMENTATION			
<p>Delay in infrastructure handover and payment to private sector proponent increases cost of operations</p>	<ul style="list-style-type: none"> • Clause for conditions precedent must be put to action, and not just included in the contracts, operators must be compensated for delays on part of the authority • Similarly, operators be penalized for delays on their part in commencement of commercial operation • Payments to the private operator to be made within the due course of time as specified in the contract. Any delays must be accompanied by due compensation • Conditions precedent clause must include the provision of utility connections and must be put into action 	<p>City authority</p>	<p>Short term</p>
<p>Dearth of competent private operators</p>	<ul style="list-style-type: none"> • Contracts with small coverage (say 3-4 routes) may be implemented to invite small players with low finances but strong technical capacity to participate and operate buses along a few specified routes 	<p>City authority/ city bus SPV</p>	<p>Short term</p>

Barriers	Suggestive Actions	Action by	Time period*
	<ul style="list-style-type: none"> Operator selection criteria be designed in such a way that private players having experience in operating or other similar modes (e.g. trucks) can participate 		
Inadequate capacity for monitoring and control	<ul style="list-style-type: none"> Implementation of city-wide ITS in bus system to reduce manpower requirement in monitoring Dedicated tem/ cell within bus authority specifically for monitoring of services provided by private operators 	City authority/ city bus SPV	Short term
Lack of transparency and clarity in offences resulting in imposition of penalty on the private operators	<ul style="list-style-type: none"> Access to a common software accessible by all concerned stakeholders (authority, private operators, drivers), which tracks any deviation from expected standards of performance Implementation of an integrated bus management ITS, involving a common dashboard, enabling trust between the authority and private operators and reducing the scope for subjectivity in imposition of penalties. 	City authority/ city bus SPV	Short term

*Short term: upto 1 year, Medium term: 1 to 3 years, Long term: more than 3 years

6.4 GENERATION AND EVALUATION OF PPP MODELS

The activities involved in the entire value chain of city bus private operations have been mapped. Based on the allocation of responsibility for undertaking each of these activities, four types of PPP models have been developed. These models have then been evaluated on several parameters to assess their viability and a comparative assessment has been made.

6.4.1 VALUE CHAIN ACTIVITIES IN BUS TERMINAL DEVELOPMENT AND OPERATIONS

A number of activities are involved in the operation of city bus services. The first phase is planning and designing, which involves activities such as demand assessment, operations planning, tariff fixation and setting service level benchmarks. The successive phase is the implementation phase, involving the broad activities of fleet and permit procurement, set up of control room, marketing and branding. This is followed by the Operation and Management of the city bus services which covers a host of activities for undertaking the day to day operation of the bus services. The activities involved in the value chain of city bus operations are described below. These have then been assigned to the private player or the public authority, and four PPP models have been developed.

I. PLANNING AND DESIGNING:

Demand Assessment and route planning: The demand for city bus services in terms of number of buses required and routes to be covered needs to be assessed. Both spatial as well as temporal demand needs to be estimated, based on which, the routes would be planned. Routes may also be bundled to be assigned to various private operators in case of a multi-operator model.

Setting service standards: The public authority needs to clearly specify the standards of performance that its city bus service is expected to deliver on. This would enable monitoring of performance against set standards, and also ensure accountability. The standards set must be as precise and quantifiable as possible, and must not leave any scope for ambiguity or subjectivity. The service standards would be based on parameters such as accessibility, regularity, adequacy, punctuality, reliability, safety etc.

Operations Planning: Based on the demand assessment, the detailed plan for operation of the city bus services needs to be drawn, including time tables, frequency of the service, stoppages etc. The method of fare box revenue collection also needs to be decided at this stage, depending upon the infrastructure and cost-effectiveness of various systems. Two broad ways of collecting fares are: On-board – user of system pays for travel fare on-board the bus. The conductor collects fare and issues ticket to user. This is the most common form of revenue collection mode. Off-board – in this system passenger pays fare before boarding the bus. There may or may not be a ticket verification system on-board. This system is common in developed countries. It requires adequate infrastructure for ticket dispersion, collection of money and ticket verification system on the buses. This also includes specifications of the fleet to be procured, such as the type, capacity, design and technical specifications of buses.

Tariff fixation/ structuring/ revision: An important step in the planning stage is the fixation of bus fares, as well as their periodic revision. This activity is suggested to remain with the public authority, since fares are governed by a host of factors, which include social and political considerations. City authorities are suggested to go through World Bank's Toolkit on Fare

Collection Systems for Urban Passenger Transport particularly the practice on fare structures for a more detailed treatise on the subject

Investment planning and funding: The city authority needs to develop a financial plan which clearly specifies the strategy for funding its bus operations. Since fare-box revenues are often insufficient to cover bus operation costs, non-fare box revenue such as revenue from advertisements, congestion charges, and innovative taxes (such as employer tax and green tax) should be exploited. Grants and loans from international financial institutions, and public-private partnerships could also be used for supplementing the massive funding requirement for city bus operations. The financial strategy formed by the city authority would determine the operating surplus or shortfall as well as mechanisms to close the gaps in the case of the latter. The strategy will estimate potential cost savings from outsourcing of city bus operations.

II. IMPLEMENTATION

Procurement of fleet and permits: This activity involves the actual procurement of the bus fleet, which could be done by either the private operator or the public authority, depending on the financial strengths of the two parties. If a public authority is financially strong and does not want to be captive to the private operator, it may choose to procure the fleet on its own. Alternatively, if the authority is not financially strong enough to invest in the fleet, it may ask the private operator to procure the fleet. Procurement of fleet by the operator enables it to hold bus manufacturers directly accountable for after-sales support, without the involvement of the authority. The Motor Vehicles Act stipulates that no public service vehicle can operate without a 'permit'. The city authority has to obtain these permits, clearly stating type of permits the authority plans for its bus operations. The options include area permit, route permit or a combination of area and route permits.

Set up of control room: A control room serves as a centralized center for capturing ITS data, as also for broadcasting passenger information in the terminal/ bus shelters. The responsibility for setting up and operation of the control room would need to be assigned to the appropriate party.

Marketing and Branding: Developing an overarching marketing and branding strategy is essential to ensuring a successful implementation of improved provision of bus transit services in the city. The importance of outreach of any public transport services cannot be overstated. The challenge is to develop a customized communications strategy for city bus services including customized messaging for audience, selection of media tools, etc.

III. OPERATIONS AND MANAGEMENT

Operation of buses: This involves the operation of bus services on a day to day basis, in line with the operational plan set out in the planning stage. The operation of buses would include provision of drivers and conductors, and operating the services along the designated routes as per the timetables decided.

Revenue collection: The city authority may collect fare box revenue on its own, or may outsource to a third party. In both cases, either the authority or revenue collection agency procures, owns and maintains equipment for collection of revenue. When outsourced, the fare collection contracts need to be for periods in line with the serviceable life of the equipment. Alternatively, the private bus operator may collect the fare box revenue when it itself assumes the revenue risk. In this case, the equipment is owned and maintained by the operator.

Service quality monitoring: Operation of city bus services needs to be monitored against set standards to ensure that the service quality envisaged is actually being delivered to the commuters. Irrespective of the type of PPP model selected, the public authority would undertake this activity of monitoring day to day operations. Any deviation from the set standards could invite penalty as per the provisions in the contract document.

Operation of control room: Operation of the bus services would need to be controlled from a common command and control centre. Staffing of the control room and day to day operation including collection and analysis of data would need to be carried out.

Bus fleet maintenance: Maintenance of the bus fleet involves activities that ensure that the buses being operated are in a good condition. It involves day to day cleaning of buses, repair of broken parts etc.

6.4.2 PPP MODELS IN CITY BUS PRIVATE OPERATIONS

Based on the allocation of responsibilities for the various identified activities in the value chain of city bus operations, the following four types of PPP models have been proposed:

1. GCC
2. Hybrid GCC
3. NCC
4. Hybrid NCC

I. GROSS COST CONTRACT

In a GCC model, the public authority takes a major role in managing the network, contracting the operators and paying them to provide a set level of services under set quality standards. Under this type of contract the authority carries the revenue risk, plans overall services, manages the contract for level of service and quality, and is ultimately responsible for customer service. The authority usually specifies the minimum number of kilometres the private operator has to ply. The risk assigned to the operator is operational risk; including responsibility for service frequency (no missed trips) and compliance with quality and safety standards (bus quality, cleanliness, driver behaviour, safety etc.).

In this type of model, the private operator is paid the quoted amount per km by the authority. Dead mileage should be specified as included or excluded in the contract document. The *bidding parameter* is the fee per kilometre quoted by the private operator.

This contract is suitable if the authority (having access to finance) wishes to take a dominant role, control service planning, and assume the revenue risk or the routes are likely to be unviable. A city with low ridership routes, where the revenue risk would seem unmanageable to the operator, is suitable for adopting a gross-cost model. This contract sets overall Minimum Service Levels (MSL)/ Key Performance Indicators (KPIs) and requires close monitoring by the authority. By its inherent nature, this contract grants a greater control to the authority.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under the GCC model is provided below.

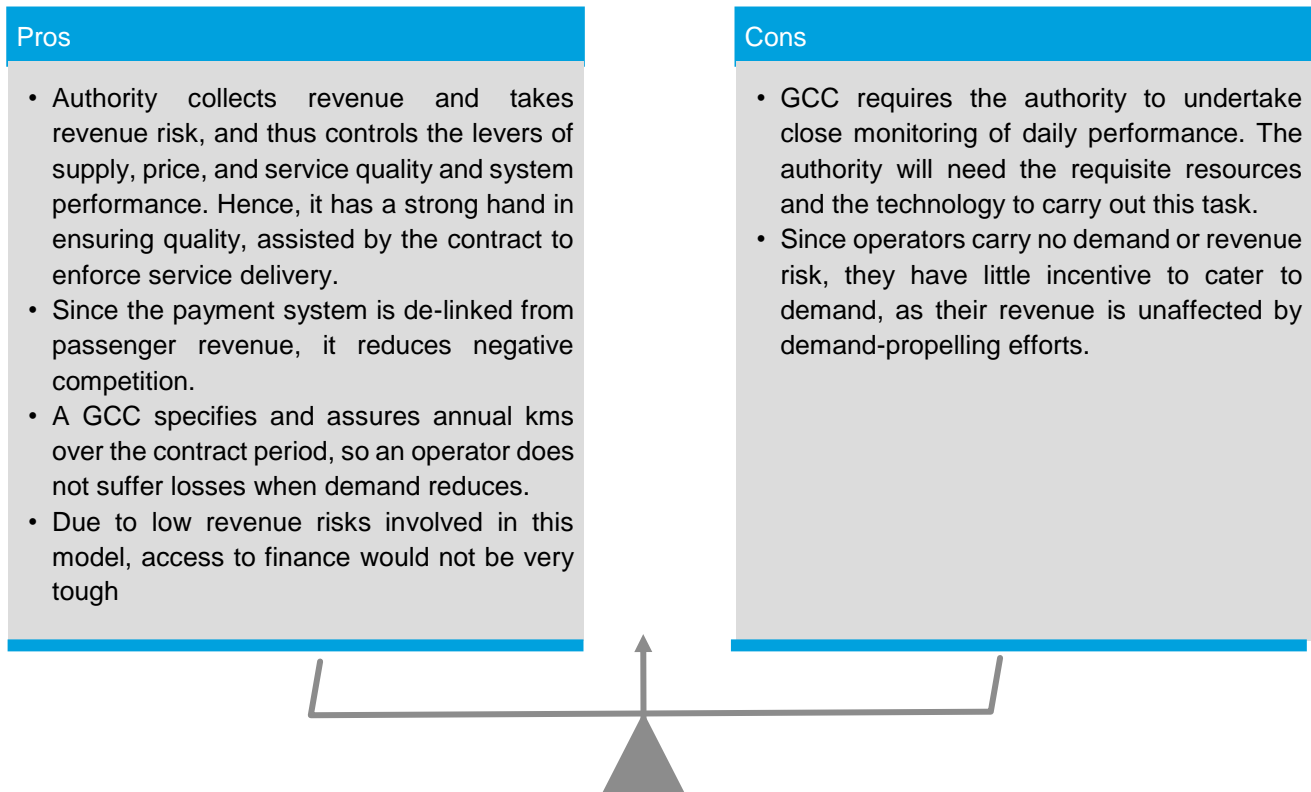
Exhibit 34: Responsibility Allocation under GCC model

PHASE	PLANNING	IMPLEMENTATION	O&M
		MONITORING	
ACTIVITY	Demand Assessment	Procurement of fleet and permits	Service Quality Monitoring
	Route Planning	Set up of control room	Operation of buses
	Setting service standards	Marketing and branding	Revenue collection
	Operation Planning		Operation of control room
	Tariff Fixation/ Structuring/ Revision		Bus fleet maintenance
	Investment Planning and Funding		
	Deciding on length of contract		



PROS AND CONS

The pros and cons of the Gross Cost Contract model are exhibited below.



FINANCIAL ASSESSMENT

In GCC, authority has full flexibility in spatial and temporal deployment of contracted bus kms to meet projected travel demands. Authority collects revenue from services as per predefined user tariffs and makes payment to operators on the basis of contracted rates per bus km and the quantum of contracted kms during a given period; pays for other services such as revenue collection as per contracted rates, administrative and other services in-house as applicable, etc. Should revenue from user tariff plus the compensation obtained from the state government for providing socially relevant un-economic services and that for concessional services, exceed the total payments/expenses for all services acquired/provided, the project would appear to be financially viable. In case of sub-optimal utilisation of contracted and optimally deployed resources, and or inadequacy of user tariffs (not decided on the basis of cost of inputs and reasonable profitability) and or lack of compensation by the state government for delivery of social and concessional services, etc revenue collected would fall short of expenses, making the projects un-viable.

In GCC, while authority has full flexibility in deployment of contracted resources, bus operator tends to maximise operational bus kms with least focus on increasing patronisation of services causing revenue loss to the authority. Adequate safeguards against such tendencies have to be taken by the authority for improving viability of city bus projects under GCC. The Hybrid GCC model discussed in the following section provides such safeguards.

II. HYBRID GROSS COST CONTRACT

A variant of the gross cost contract is the Hybrid GCC. Under this model, the authority still carries prime responsibility for passenger service outcomes and sets explicit service obligations, but incentivises the operator through additional payment for ridership growth. It thus enables risk sharing between the two parties.

The authority supplements fixed payments with bonus payments linked to ridership increase. This payment mechanism will require the necessary technology to collect ridership data. As these ridership payments are supplementary, it avoids negative competition for passengers. The additional passengers transported are only an incentive to further increase the revenue potential of operators, rather than been the prime determinant of the operators' revenue, which is a fixed per km fee. Thus, unhealthy competition, wherein operators compromise on safety in the race to increase ridership, is reduced. The bidding parameter is the fixed per-km fee and the variable fee per passenger for additional ridership over base figures. This method requires base revenue to be set, and good data on ridership growth.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under the Hybrid GCC model is provided below.

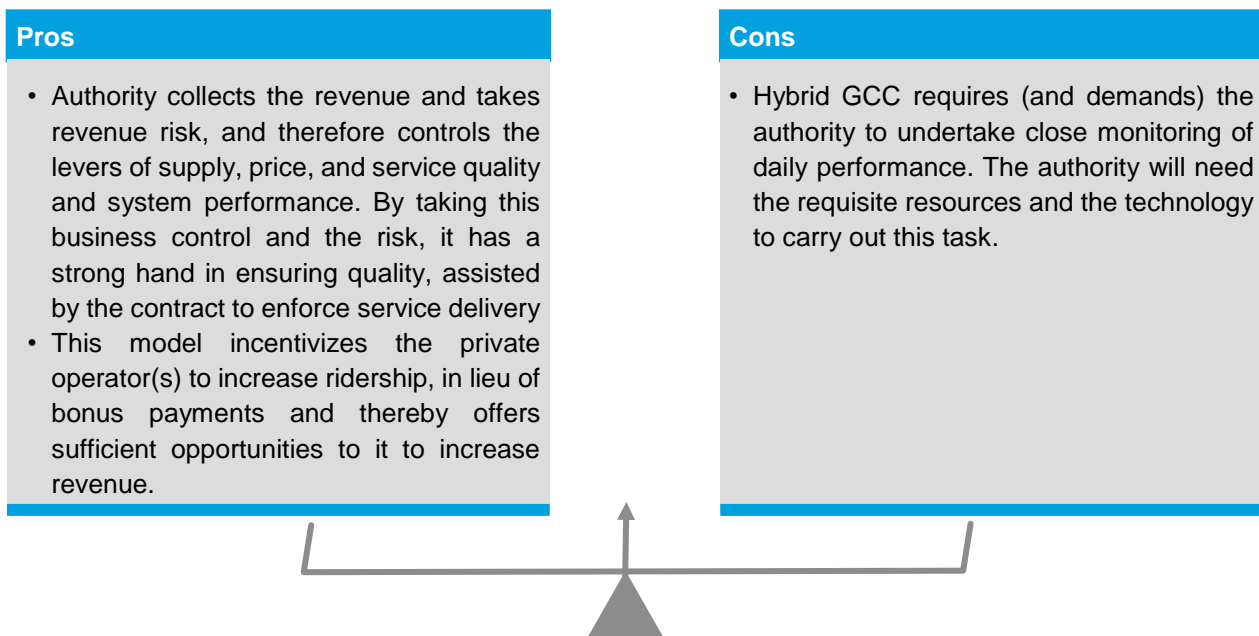
Exhibit 35: Responsibility Allocation under Hybrid GCC model

PHASE	PLANNING	IMPLEMENTATION	O&M
		MONITORING	
ACTIVITY	Demand Assessment	Procurement of fleet and permits	Service Quality Monitoring
	Route Planning	Set up of control room	Operation of buses
	Setting service standards	Marketing and branding	Revenue collection
	Operation Planning		Operation of control room
	Tariff Fixation/ Structuring/ Revision		Bus fleet maintenance
	Investment Planning and Funding		
	Deciding on length of contract		



PROS AND CONS

The pros and cons of the Hybrid GCC model are exhibited below.



FINANCIAL ASSESSMENT

Extending project viability discussions of GCC further to GCC hybrids, and the payment mechanism in latter case, GCC hybrid tends to be more viable than GCC other aspects remaining unchanged.

III. NET COST CONTRACT

Under this model, the public authority assigns to a private operator, the permission to carry out business through designated routes or service areas generally with a level of exclusivity and protection from competition, in return for a monthly fee or payment of grant, as the case may

be. The operator retains the fare box revenue collected from the passengers and has the economic incentive to increase the ridership in the buses. Under this model, the operator conducts service planning but it has to comply with conditions set by the authority such as MSL, Quality, Fleet Deployment Plan, age of vehicles and fare rules. The *bidding parameter* is the monthly system management fee payable to the authority or grant payable to the private operator.

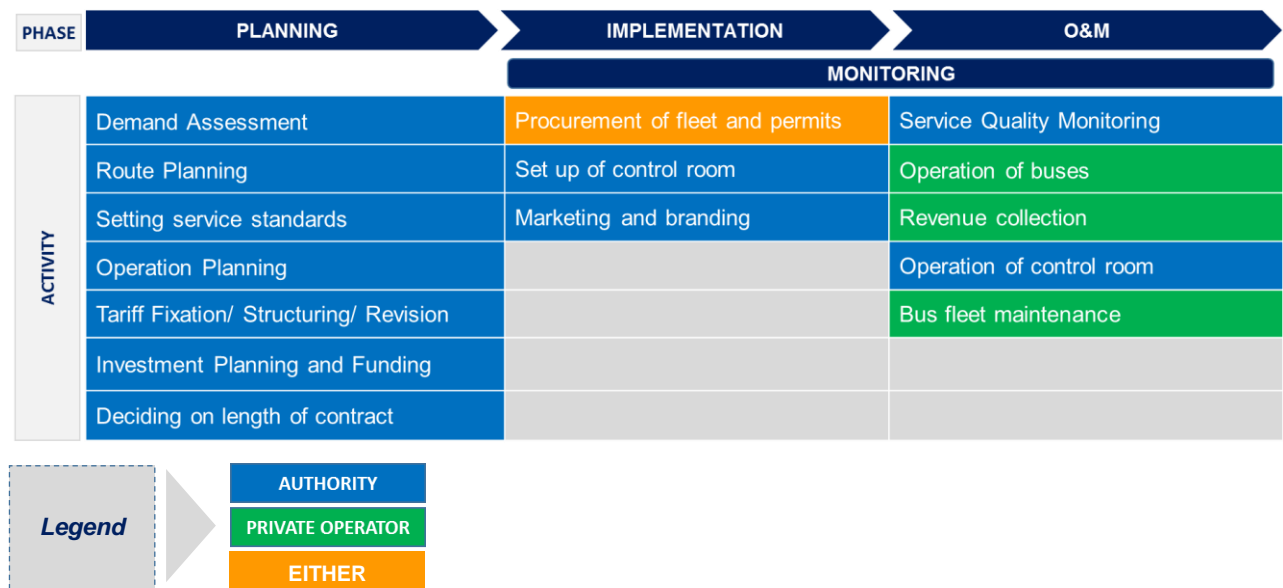
The private operator agrees to pay to the authority, a fixed amount or share a part of the revenue it collects (system management fee), or the operator demands a grant from the authority. This method is most suitable where there is considerable and assured demand or where the operator is fully protected from competition, else in case of shortfall the operator may demand a grant. It also requires willing and capable operators. However, where the operator takes the full revenue risk, it weakens the authority’s hand of control which may lead to undesirable outcomes. The authority as part of its regulatory function will monitor operations. The NCC option may be preferable where the authority wishes to be less involved, and rely more on the private sector to deliver services under an entrepreneurial model.

In order to make the model successful and viable from the operator’s perspective, the authority should enable an operating environment that guarantees commercial operating speeds (as is the case with BRTS). Also, passenger fares must be reviewed at regular intervals, specially when there is a hike in diesel price, so as to provide a safeguard to operators against cost escalations.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under the NCC model is provided below.

Exhibit 36: Responsibility Allocation under NCC model



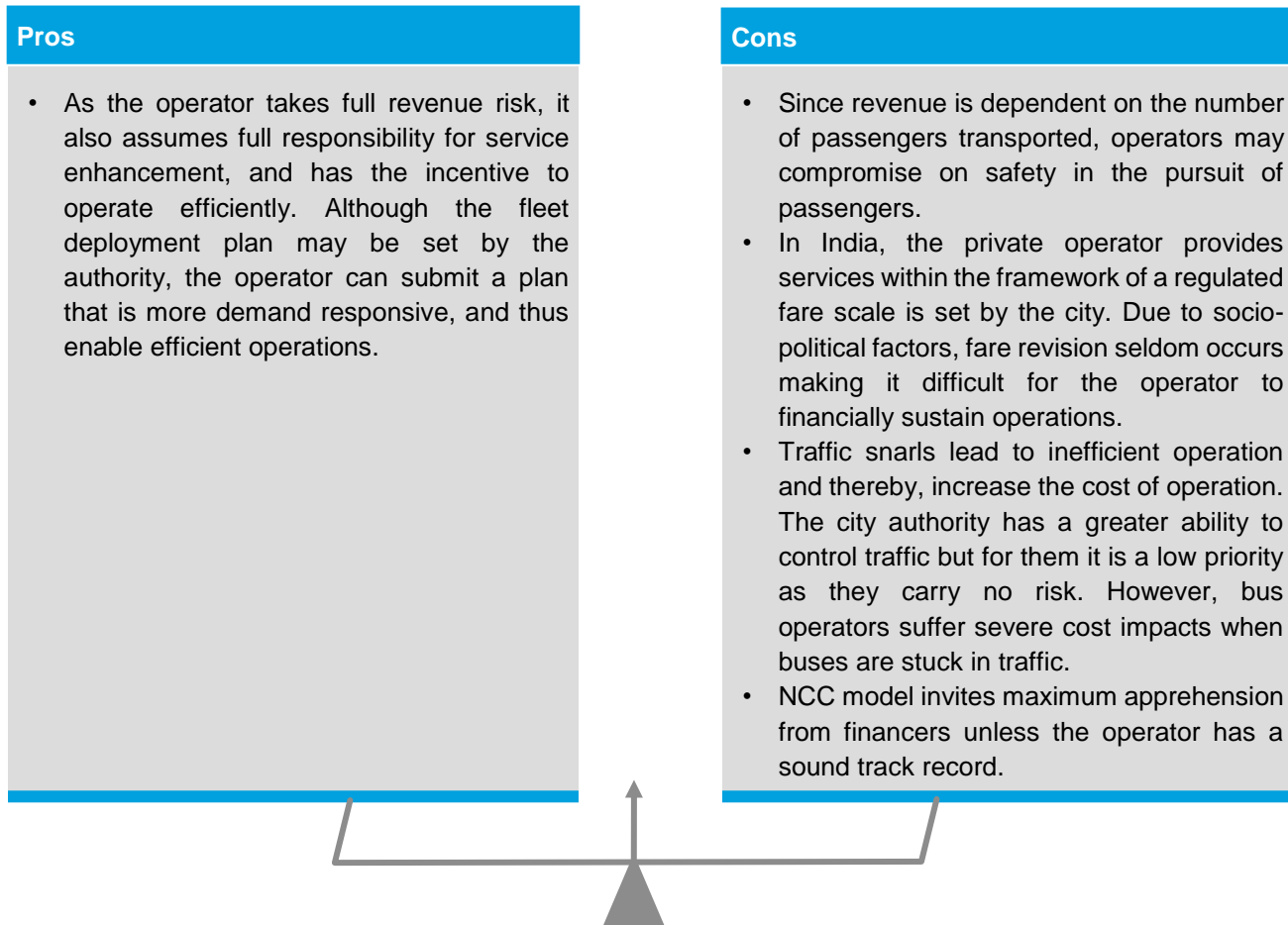
FINANCIAL ASSESSMENT

In NCC, the entire revenue risk is taken by the private operator who, in the current Indian environment, is poorly equipped to make travel demand and revenue projections including likely

revenue losses due to operation of socially relevant but uneconomic operations as also for concessional passengers servicing, besides losing potential revenue due to delayed / inadequate passenger tariff revisions by the authority. Private operators in NCC are thus showing very little interest in obtaining such contracts for bus transport services. NCC contracts have been/ are likely to get poor response.

PROS AND CONS

The pros and cons of the NCC model are described below.



IV. HYBRID NET COST CONTRACT

In Hybrid Net Cost Contract (a variant of the Net Cost Contract), the authority supports non-commercial routes where service on the routes needs to be provided as a public service obligation. This lowers the revenue risk assumed by the operator. Where a non-commercial route is within an operator's contract area, and the authority wishes to subsidize its operation, the fee would be fixed and stated in the RFP. The fee per km shall be calculated based on total cost of operation less the amount of cost recovery through revenue collected. As in NCC, the *bidding parameter* in this case shall be system management fee or a grant.

This contract type is suitable for more skilled, willing and experienced operators who are capable to undertake service planning and manage almost all the revenue risk, and where the authority does not have the skill for business management. It can be used in a city where the revenue

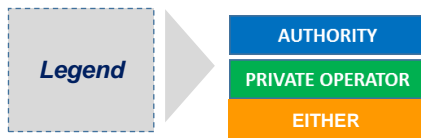
risk, to be undertaken on certain routes, is unmanageable for a single party. The authority sets overall MSL/Quality KPIs and needs to monitor outcomes.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under the Hybrid NCC model is provided below.

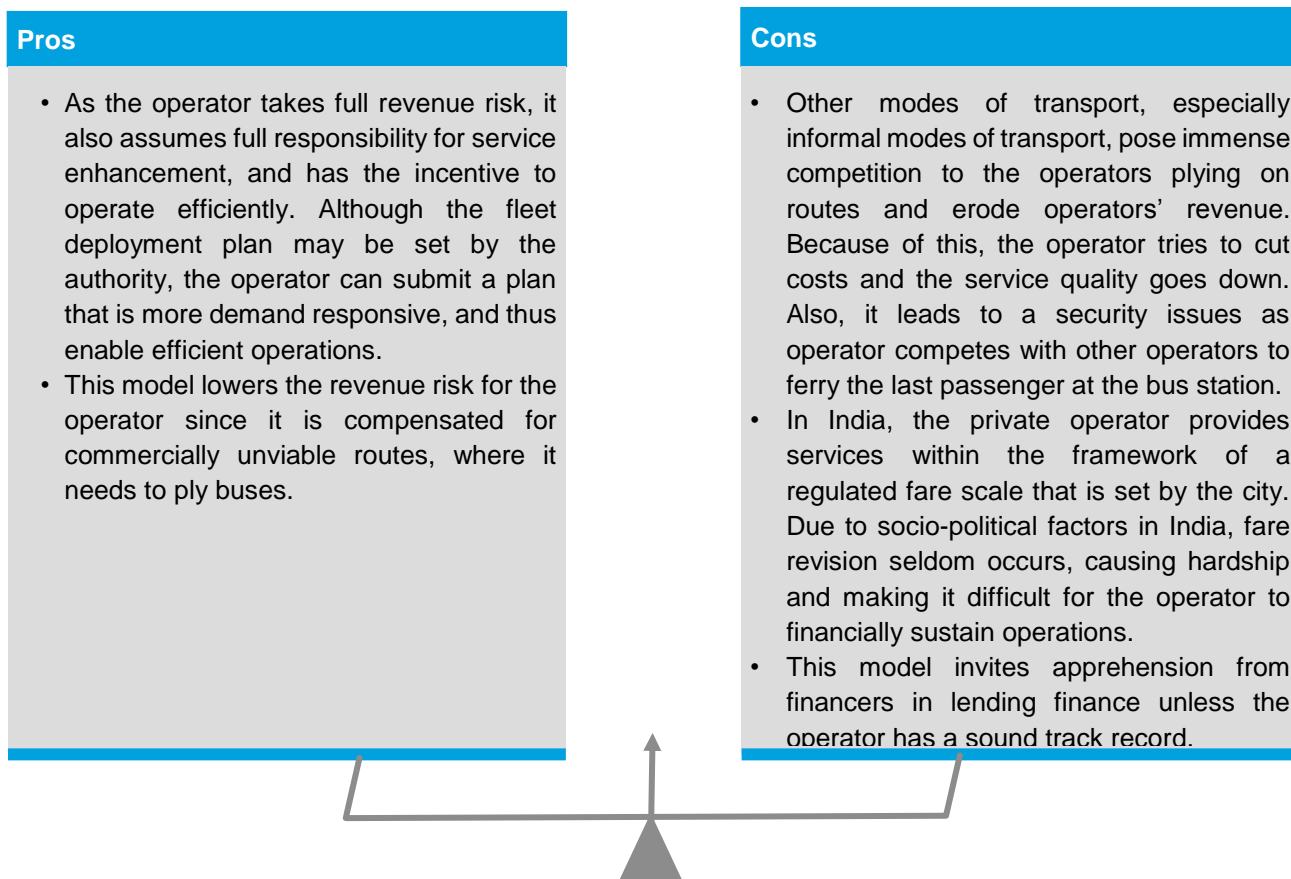
Exhibit 37: Responsibility Allocation under Hybrid NCC model

PHASE	PLANNING	IMPLEMENTATION	O&M
		MONITORING	
ACTIVITY	Demand Assessment (including demand on socially relevant but uneconomic routes and specifying quantum of likely support for such routes)	Procurement of fleet and permits	Service Quality Monitoring
	Route Planning	Set up of control room	Operation of buses
	Setting service standards	Marketing and branding	Revenue collection
	Operation Planning		Operation of control room
	Tariff Fixation/ Structuring/ Revision		Bus fleet maintenance
	Investment Planning and Funding		
	Deciding on length of contract		



PROS AND CONS

The pros and cons of the Hybrid NCC model are described in the adjoining diagram.



FINANCIAL ASSESSMENT

Some of the drawbacks of NCC are taken care of in NCC hybrid model, by the authority, by way of pre-estimating likely revenue shortfalls on socially relevant and uneconomic operations; concessional travellers and committing to bridge the revenue gaps between reasonably expected levels and the ones in such operations. This, to a large extent, addresses some of the concerns of private operators opting for NCC hybrid model and thus induces better participation than the pure NCC model.

Capital cost estimates:

The below cost estimates are for procurement of a bus fleet of 100 buses.

ACTIVITIES	Unit	Unit (Nos)	Costs per unit (INR Lakh)	Total (INR Lakh)	Remarks/Assumptions
Buses	Nos	100	50	5000	Buses are Low floor Standard Size non AC diesel fuel as per UBS II
Bus Depot	Nos	1	300	300	5 acre bus depot considered for 100 buses
ITS	Nos	1	200	200	Block cost for 100 bus system
Plant & Equipment for Depot	Nos	1	350	350	Block cost for equipping 5 acre bus depot
Total Capex				5850	

Operation & maintenance estimates: The below cost estimates are for operation and maintenance of a bus fleet of 100 buses. The operation and maintenance cost also includes capital servicing cost to cover the cost of capital expenses. All costs per unit are annual costs.

ACTIVITIES	Unit	Unit (Nos)	Costs per unit	Total Annual Cost (INR Lakh)	Remarks/Assumptions
Staff cost	Nos	800	1.8 lakh	1440	8 staff per bus with average salary of 15000 per month
Bus fleet maintenance	Nos	100	5 lakh	500	10% of Bus Cost every year
Fuel Cost	Kiloliters	2000	50000	1000	200 kilometers per day travelled by each bus, Fuel efficiency Non-AC – 3.65 kilometer per liter
ITS Maintenance	Nos	1	40 lakh	40	20% of ITS capital cost
Infrastructure Maintenance	Nos	1	30 lakh	30	5% of depot cost less land cost
Capital Servicing Cost	Nos	1	1170 lakh	1170	20% of Capital Cost every year
Total Opex				4180	

Revenue estimates: The below revenue estimates are for operation of bus fleet of 100 buses over a period of one year.

ACTIVITIES	Unit	Unit (Nos)	Revenue per unit	Total Annual Revenue (INR Lakh)	Remarks/Assumptions
Fare box Revenue	Passenger kilometer	3577 lakh	1.0	3577	Load Factor – 70%, Bus Capacity – 70, Kilometers per day – 200 kilometers
Advertisement	Nos	100	48000	48	INR 4000 earning per bus per month
Total Revenue				3625	

It emerges that fare box revenue and income from advertisements is insufficient to cover even the operating costs of city bus operation. Hence, grants by the Central/ State Governments would be needed in order to make PPP in city bus operation a financially viable model.

6.4.3 EVALUATION OF PPP MODELS PROPOSED



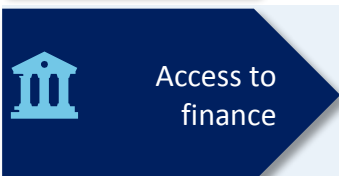
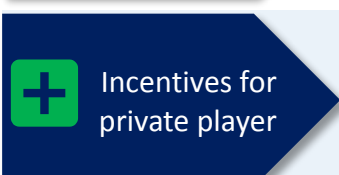
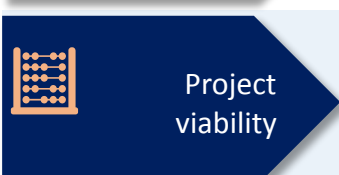
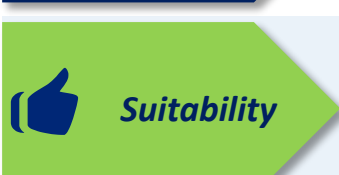
Each of the proposed PPP models has its own pros and cons, and different models may be suitable in different contexts. The models have been evaluated on the following parameters to ascertain their viability and a comparative assessment has been made.

6.4.4 CONCLUSION

Following qualitative evaluation of various types of contracts, need for operational flexibility, possibility of obtaining improved operational safety and service quality delivery performance;

ease of monitoring and control; rationalised revenue risk distribution and the capacity of PPP partners etc., choice of contracts for bus transport operations appears to emerge as under in descending order: GCC hybrid, GCC, NCC hybrid and NCC.

Exhibit 38: Parameter –wise feasibility of City Bus Operation PPP models

	GCC	GCC Hybrid	NCC	NCC Hybrid
 Operational efficiency	Medium, since operators are assured of revenue and can focus only on operational efficiency	High, since operators revenue is guaranteed, while incentives exist for increased ridership	Low, since operators bear the revenue risk and may skip trips/reduce frequency in case of low ridership	High, since operators' gets revenue from un-viable routes also
 Investment Requirement	High, preferably investment in buses should be by private player	High, preferably investment in buses should be by private player	High, preferably investment in buses should be by private player	High, preferably investment in buses should be by private player
 Access to finance	High, since guaranteed per km fee reduces credit risk	High, since a part of the operator's revenues are assured, thus reducing risk	Low, increases credit risk especially if no track record of operators or demand is uncertain	Medium, since credit worthiness is increased as non-commercial routes are supported.
 Incentives for private player	Medium, since revenues are guaranteed and not dependent on passengers transported	High, since revenues are partially guaranteed, and incentives are provided for increasing ridership	Low, since revenue risk is to be borne by them, with no control over fares and other external factors	Medium, since Authority compensates for lack of ridership on unviable routes
 Project viability	High on viability from the private sector perspective	High on viability from the private sector perspective	High on viability from the authority's perspective	High on viability from the authority's perspective
 Suitability	When Authority wants to retain control and is financially strong to assume revenue risk, has strong monitoring capacity	When Authority wants to retain operational control and intends that operator shares some revenue risk	When competent operators willing to assume revenue risk exist and demand is relatively certain	When authority is willing to reduce control over operations, while financially compensating for unviable

7. BUS TERMINAL

Buses are the predominant mode of motorized public transport in Indian cities. Success of bus-based public transport largely depends on the supportive infrastructure, which facilitates the smooth functioning of the service, its providers and benefactors. Bus stops, bus terminals and depots form the supporting infrastructure components for operation of bus services. A bus terminal is the point where a bus route starts or ends, where vehicles stop, turn or reverse, and wait before departing on their return journeys. It is also where passengers board and alight from vehicles. Bus terminals constitute one of the major category of supportive infrastructure which assist the effective, timely and comfortable movement of bus services for both city based and inter-state operations.

Until the mid-2000s, the development of bus terminals in India was undertaken by state run transport corporations or nodal city development authorities. Post 2004, when the urban local bodies were reeling under cash strapped situations, the development of bus terminals were gradually paved out to more attractive PPP modes.

The 12th FYP envisages an investment of INR 1280 crore for development of bus terminals in India, with PPP as the preferred mode of development. Land for development of terminals would be provided by the government for over 2000 terminals identified for development. With the huge fund requirements and the enhanced focus on leveraging private sector investments, PPP emerges as a logical solution.

7.1 PUBLIC PRIVATE PARTNERSHIP IN BUS TERMINAL DEVELOPMENT

PPP in bus terminal development has picked up mixed precedence in India since early 2005. Over the period, bus terminals from a mere point of transit for passengers have grown into active commercial hub with more advanced amenities. The role of a private partner offering technical expertise and financial feasibility, thus is explored to facilitate construction of a modern bus terminal under PPP mode. Private player, in the context of bus terminal development, refers to private real estate developers and private terminal operators. Being a support infrastructure to the increasing bus transportation network, terminals have the potential to serve the

Amritsar Inter-city Bus Terminal

Spread across an area of 8.5 acres, the existing bus terminal of Amritsar city, was proving to be incapable of handling the growing traffic. The existing terminal building being in a state of disrepair, the DoT, Govt. of Punjab, decided on modernising and developing the existing Amritsar bus terminal through the BOT route. This project was among the first bus terminal projects in India to be built and operated by the private sector through the BOT route. The Intercity Bus Terminal of Amritsar city was developed at the same location as the existing bus terminal. The project involved demolishing the existing terminal building and complex and development of a modern state of the art Intercity Bus Terminal to cater to the growing demands of the city.

Under the concession agreement, the private operator was responsible for financing, building, operating and maintaining the terminal complex for the concession period of 11 years and 5 months. The private operator was required to pay a project development fee of INR 35 lakhs for the project site and a lease rental of INR 50,000 per month for use of the project site over the concession period. The sources of revenue identified were collection from bus operations and rentals from commercial exploitation, sale of advertisement rights and parking fees.

Reference: <http://toolkit.pppinindia.com/ports/module3-rocs-aibtp1.php?links=aibtp1>

commercial interest of the developer. While facilitating a comfortable journey and riding experience, it can generate revenue through rental space, commercial advertisements and fees levied from the private sector proponent (commonly referred as 'adda fees'). In present context, bus terminals are exploring options to more ambitious models like integrated complex with built – in hotels and resorts, tourism interests, convention facilities and curated commercial hubs which can potentially transform the overall perception of the project.

In India, under the exiting private participation bus terminal projects, the Authority usually provides space and infrastructure for bus terminal (e.g. land and facilities), and monitors the performance of the private operator. The private player constructs the bus terminal facility and undertakes operation and maintenance activities.

Modern Inter-state Bus Terminal – Dehradun

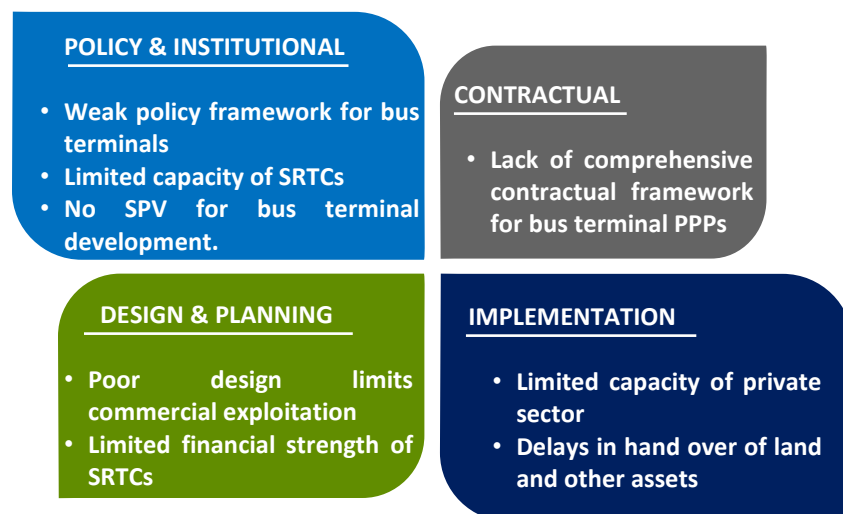
Mussoorie Dehradun Development Authority (MDDA) appointed a private developer, Ramky Infrastructure Ltd, for development of a modern bus terminal in Dehradun on Design, Finance, Build, Operate and Maintain basis for a contract period of 20 years, extendable upto 30 years. Revenue model for the developer is adda Fee from the scheduled 750 buses per day, lease rental & other forms from commercials and user fee from value added services. MDDA was to receive an annuity payment from the developer, which was the bidding criterion. MDDA benefitted with no exposure cash exposure in construction, operation and management. It received guarantees annual revenues of INR 81 la, with inflation of 5% p.a. The terminal was equipped with modern facilities and amenities, along with a commercial and entertainment complex, and served as a showcase project for the city: MDDA's pride.

Reference: http://smartcities.gov.in/writereaddata/Compendium_of_PPP_CasesMoUDs.pdf

7.2 KEY BARRIERS

Development of a bus terminal on PPP mode faces several barriers ranging from policy issues to project implementation challenges which can pose as threats for the successful execution of the project. In the subsequent sections, details about the key barriers are discussed. The key barriers have also been highlighted in the adjoining exhibit.

Exhibit 39: Key barriers to PPP in terminal projects



7.2.1 POLICY AND INSTITUTIONAL

Despite some successful bus terminal PPP transactions, the institutional mechanism that arranges the PPP lacks uniformity which leads to ambiguity in decisions between the private sector proponent and the authority.

- Absence of policy framework for bus terminal projects:** A sound policy framework paves the way for planned development and provides direction to the activities to be performed within that sector. In India, a defined policy for bus terminals is currently lacking, and bus terminal projects so far have been undertaken by state road transport corporations without any central level guidance and direction. There is an urgent need for a robust policy framework specifically for bus terminal projects, similar to the NUTP which provides direction to the development of the urban transport sector in India. A documented policy to support development of bus terminals will provide impetus to private developers and also help in mitigating the conflicts arising out of sharing responsibilities by respective authorities and institutions. The policy would have a clearly defined vision for bus terminal development, and would be backed by objectives and related implementation plan. The policy could provide direction on various aspects of bus terminal development, such as involvement of private participation, commercial exploitation of bus terminal space, financing mechanisms, and could also encourage the creation of dedicated SPVs for bus terminal projects.
- A documented policy provides direction for the development of a sector. The NUTP 2006 is a central level policy to guide the state action plans in the urban transport sector, and provides direction on planning, institutional, legal as well as financing aspects of urban transport. It includes provision for VGF for identified urban transport projects, setting up of UMTAs, innovative financing mechanisms and encourages private participation under well-structured contracts.
- Weak institutional framework and organizational capacity:** Given the importance of bus terminals in the overall public transport system of a city/state, creation of a robust institutional framework for bus terminal development goes a long way in enhancing the development and operation of terminals. In India, bus terminals are mostly developed and operated by State Road Transport Corporations (SRTCs), which have limited competence in commercial exploitation of the terminal space. The two broad components of bus terminal operations are bus terminal management activities and commercial exploitation of the available space. While most SRTCs are fairly competent in bus terminal operations (e.g. Telangana State Road Transport Corporation), they have so far not been able to commercially exploit the terminal space in the most efficient manner. Even when land is available with the SRTCs, they do not possess the required expertise to develop the piece of land and leverage its commercial potential. The limited resources of SRTCs are employed in day-to-day management of terminal activities, and commercial exploitation such as development of multiplex, shopping mall, hotel etc. takes a backseat. This gives rise to the need for creation of a dedicated unit or SPV at the state level, specifically for bus terminals, so that SRTCs can continue to focus on state bus operations.
- In Rajasthan, an independent authority by the name of Rajasthan State Bus Terminal Development Authority has been established through the Rajasthan State Bus Terminal Development Authority Act 2015, solely for the purpose of developing and managing bus terminals across the state.

A dedicated SPV with expertise in all aspects of bus terminal development such as planning of terminal operations, land development, revenue exploitation and PPP arrangements would be better placed to efficiently develop and manage bus terminals, as compared to traditional SRTCs. Passenger experience at the terminal could also be enhanced through the use of Intelligent Transport System to provide advanced amenities, and traditional ways of operation could be improved upon.

- **Limited integration with other transport agencies:** In order to provide seamless connectivity to passengers, integration with other modes of transport is critical. However, coordination of transport agencies within most cities such as Delhi, Kochi and Hyderabad is weak, which also hampers the complete exploitation of revenue potential. In Hyderabad, for example, TSRTC land is available next to a metro station, but is currently not utilized. If developed in a planned manner and in coordination with the metro agency, it could enable seamless interchange of transport modes and also enhance revenue potential through higher ridership. A dedicated SPV for bus terminals could strategically coordinate with other transport agencies, and also identify such mutually beneficial opportunities, thus improving the viability of bus terminal projects.

Thus, the policy and institutional barriers to bus terminal development and operations identified above, have a bearing on planning and implementation of bus terminal projects. These barriers need to be addressed since they form the basis of any bus terminal project and play a pivotal role in the success or failure of such projects.

7.2.2 PLANNING AND DESIGN

Planning in this present context comprises technical and financial aspects associated with the development of the bus terminal. Technical aspects ranges from design, spatial structuring and construction, to re-development and relocation of existing facilities of the project while financial aspects deal with the viability and sustainability of the project aligning with the investment required to execute the project. The key barriers in terminals of planning and design are discussed below.

- **Poor design limits the scope for commercial exploitation:** Bus terminals are a high footfall facility, and hence, offer significant opportunities for revenue generation. When a huge product mix is envisaged for a bus terminal, such as commercial complex, shopping mall, hotels, etc., designing of the facility assumes utmost importance. However, in many bus terminals in India, commercial exploitation has been limited, partially on account of improper designing. For example, in Hyderabad, the inter-city bus terminal has few takers for its commercial spaces, primarily due to inadequate parking space for private vehicles as well as the absence of a separate entry for the commercial spaces. Noise pollution due to the huge bus traffic at the terminal also acts as a hindrance to the renting out of terminal space for official complex. Greater involvement of planning experts from the private sector can help address this barrier, and enable complete exploitation of the revenue potential. At the planning stage itself, professional experts in the field of terminal design must be hired to prepare designs that can accommodate all the proposed activities seamlessly and enable maximum commercial exploitation of the terminal space, without compromising on service quality. One such design solution could include separate entry points for commuters and those using the shopping complex. Demand assessment to decide on the appropriate product mix for the terminal space is not carried out. Professional experts in the proposed bus terminal SPV could assess the profile of bus terminal users, and along with an assessment

of the requirements within the area, develop a product mix best suited for a particular terminal.

- **Limited financial capacity of SRTCs to meet the huge financial requirement:**

Currently, the SRTCs are required to provide the bulk of infrastructure facilities like bus terminals, bus shelters, and other passenger amenities. The SRTCs are usually required to meet the above mentioned obligations out of the revenues generated by their operations, and in the absence of sufficient revenue, most SRTCs are in losses (refer adjoining exhibit). This hampers the financial viability of bus terminal projects. The creation of an SPV for bus terminals along with its own dedicated fund would ensure separation of financials of bus terminals and other bus transport operations. For example, the Rajasthan State Bus Terminal Development Authority Act provides for the setting up of a Rajasthan State Bus Terminal Authority Fund –a dedicated fund for bus terminal activities. The huge financial requirements of bus transport projects can also be met by leveraging private sector resources, which could be used both for leveraging commercial potential as well as creating bus terminal infrastructure.

Exhibit 40: Weak financial capacity of SRTCs



7.2.3 CONTRACTUAL ARRANGEMENT

Contract based award of project for the development of bus terminal is a standard practice in India. Contracts play a crucial role in ensuring the success of a PPP arrangement.

- **Lack of comprehensive model contract agreements for bus terminal PPPs:** At present, there is no model contract guideline existing for bus terminal PPP projects in India. The contractual agreement plays a crucial role in determining the interest of the potential bidder to convert into a developer. Similar to the model contracts developed for city bus operations, toolkits on solid waste management, ports and other sectors, manuals and model contract documents should be developed at the national level and be made available to states, to enable them to draft robust concession agreements. Contracts must be comprehensive and must include all relevant clauses, and must not leave room for ambiguity, so as to ensure a successful partnership.

7.2.4 PROJECT IMPLEMENTATION

Post signing of the contract, there exist several aspects that ensure smooth implementation of a PPP project. Among the key are; allocation and hand over of lands, assistance of required statutory license and approvals, release of payment sanctioned for the project and proper monitoring and evaluation during the period of construction. For bus terminals that are in brownfield stage, redevelopment of existing assets complying with the present plan requires synchronization between developers.

- **Limited capacity of the private sector:** As far as the involvement of private players in bus terminal projects is concerned, availability of private sector participants to deliver comprehensive bus terminal services is limited. There are very few private players in India with expertise in both components of bus terminals- day to day bus terminal operations as well as commercial exploitation. While there exist a number of private real estate developers with experience of developing bus terminals, most of them lack expertise in operational activities. Thus, exploring the option of outsourcing the entire bus terminal development and operations to a single private player comes with the risk of not receiving sufficient number of competent bids. There is also a threat of operational activities being ignored by the private player, once the construction part is complete.
- **Delay in handing over land and other provisions for asset development:** For the private player to construct the bus terminal facility, land needs to be identified/ procured by the public authority and provided to the developer as per the agreed timeline. However, in many cases, delays occur in the provision of land to the developer. While delay in land allocation or statutory approvals may lead to cost and time over – run, delay in providing additional assistance like supply of electricity and necessary utilities can render the project unfit for commissioning.

Analysing the above, it is evident that the key barriers arise mainly on account of institutional weakness and improper planning. The lack of cohesion and vision of authorities in most of the cases fail the PPP initiative. For a crucial component like bus terminal, which acts as a supportive infrastructure, norms and regulations favouring the private sector proponent will help in creating better infrastructure for the public transport system.

7.3 RECOMMENDATIONS TO ADDRESS BARRIERS

Having identified the barriers above, the objective of this section is to provide suggestive actions to address those barriers. In order to enable successful implementation of PPP projects in bus terminal development and operation, a facilitating environment needs to be created for the private player. At the same time, the capacity of private players to provide comprehensive bus terminal services needs to be enhanced. The key recommendations to make PPP arrangements in bus terminal projects successful are captured in the table below. Suggestive action plan to address the identified barriers and ensure success of PPP projects in bus terminal development and operation is also provided.

Exhibit 41: Barriers to PPP in Bus Terminal development and corresponding recommendations

Barriers	Suggestive action	Action by	Time period*
POLICY & INSTITUTIONAL			
Absence of policy framework for bus terminal development	<ul style="list-style-type: none"> • Publication of policy for bus terminal development and operations, covering aspects such as planning, institutional, legal and financial aspects 	Central Government/State Government	Medium term
Weak institutional framework and organizational capacity	<ul style="list-style-type: none"> • Creation of dedicated SPV - Bus Terminal Development Authority (e.g. Rajasthan State Bus Terminal Development Authority) • Experts in planning, design, real estate development to be a part of the SPV/or cell within the implementing agency 	State Government/City Authority	Medium term
Limited integration with other transport agencies	<ul style="list-style-type: none"> • Development of CMP, integration of land use plan with transport plan • Creation of a dedicated SPV for bus terminals, equipped with competent staff to coordinate with other transport agencies and enable integration 	State Government/City Authority	Medium term
Institutional restriction on permitting other transport agencies / private operators from use of terminals / terminal land when land is owned by RTCs – restrictions under the RTC act 1950.	<ul style="list-style-type: none"> • Provisions of RTC act need to be revisited to allow use of RTC owned terminals by all modes of transport. Use of terminal land for purposes additional to those stipulated under RTC act need also be addressed to facilitate their commercialization. 	State Government	Medium term
PLANNING & DESIGN			
Poor design limits the scope for commercial exploitation	<ul style="list-style-type: none"> • Detailed designs to be prepared by professional experts, keeping in mind the potential for commercial exploitation • Advertisement policy 	State Government/City Authority	Short term
Limited financial capacity of SRTCs to meet the huge financial requirement	<ul style="list-style-type: none"> • Creation of dedicated fund for bus terminal projects (e.g.: Rajasthan State Bus Terminal Development Authority Fund) 	State Government	Medium term

Barriers	Suggestive action	Action by	Time period*
	<ul style="list-style-type: none"> Leveraging private sector resources for commercial exploitation and infrastructure creation 		
CONTRACTUAL			
Lack of comprehensive model contract agreements for bus terminal PPPs	<ul style="list-style-type: none"> Development of model contract documents and provision of the same to the states/ cities 	Central Government/State Government	Short term
PROJECT IMPLEMENTATION			
Delay in handing over land and other provisions for asset development	<ul style="list-style-type: none"> Strict implementation of conditions precedent and related compensation payment in case of default by Authority 	SPV/ SRTC	Short term

**Short term: upto 1 year, Medium term: 1 to 3 years, Long term: more than 3 years*

7.4 GENERATION AND EVALUATION OF PPP MODELS

The prospects for PPP in bus terminal development and operations in India cannot be overemphasized, specially given the considerable PPP experience in this sector. However, in order to enhance the efficiency of bus terminal operations fully exploit the commercial potential of high footfall areas such as bus terminals, PPP contracts need to be structured well. In order to allocate risks to the appropriate party, the activities involved in the entire value chain of bus terminal development and operation have been mapped. Based on the allocation of responsibility for undertaking each of these activities, five types of PPP models have been developed. These models have then been evaluated on several parameters to assess their viability and a comparative assessment has been made.

7.4.1 VALUE CHAIN ACTIVITIES IN BUS TERMINAL DEVELOPMENT AND OPERATIONS

A number of activities are involved in the development and operation of a bus terminal. The first phase is planning and designing, which involves activities such as land identification, layout planning, fixation of charges and setting service level benchmarks. The successive phase is the implementation phase, involving the broad activities of land acquisition, terminal infrastructure development and provision of utilities and assets within the terminal. This is followed by the operation and management of the bus terminal which covers a host of activities for undertaking the day to day operations of the bus terminal. The activities involved in the value chain of bus terminal development and operation are described below. These have then been assigned to the private player or the public authority, and five PPP models have been developed.

I. PLANNING AND DESIGNING:

Identification of land: The first activity involved in the planning phase is the identification of land for development of the bus terminal. Bus terminals require a huge area, and the size of terminal usually varies from 1 acre in small settlements to 15 acres in bigger cities. The terminal size is primarily governed by factors such as traffic demand (present as well as future demand), traffic characteristics, functions to be performed, and the type, quantum and sophistication of facilities to be provided in the terminal.

Finalization of product mix: Product mix includes the various developments that would form a part of the bus terminal. These could include commercial developments such as malls, hotels, food courts, retail showrooms, supermarkets and office spaces, apart from the infrastructure required for operation of the bus terminal such as alighting and boarding bays, bus que shelters, passenger waiting halls, platforms, booking/ enquiry counters, office space for bus terminal administration, passenger waiting halls, sufficient public conveniences, dormitories (for night operations), telephone booths, eateries/ vendor zones, ATMs, etc. The commercial developments form a significant source of revenue and can be leveraged to fund the bus terminal operations. This also includes planning for the amenities in the bus terminal such as clean drinking water etc.

Layout and design of the bus terminal: This includes planning for the specifications of the bus terminal infrastructure, the floor area ratio, and the layout of the various developments planned.

Fixation and revision of charges and fees: An integral part of the planning phase is the fixation of entry and parking charges for various categories of vehicles, including different charges for night parking.

Service Level Benchmarks: This involves setting service level standards for performance of bus terminal operations. The benchmarks could be measurable, and clearly defined penalties should be in place in case of default in adherence to the benchmarks.

Financial Planning: Costs for development and operation of bus terminal need to be estimated, and related funding needs to be arranged. The ratio of finance to be raised through debt/ equity needs to be decided upon.

II. IMPLEMENTATION

Acquisition of land: The first activity in development of a bus terminal is the acquisition of land and the related clearances. Usually, the public authority is in a better position to acquire land and hence, this activity is suggested to remain in the domain of the authority.

Construction of bus terminal infrastructure: This involves the construction of the bus terminal infrastructure based on pre-decided specifications. Hard standing facilities such as bus bays, bus que shelters, terminal building, administrative office, waiting rooms, public conveniences, booking/ enquiry counters etc need to be developed within the bus terminal.

Provision of movable assets/ utilities: Movable assets within a bus terminal could include benches, chair, fans and lighting, pumps, tube wells, air conditioner, water coolers, generator, signages, office equipment etc., while utilities include water and electricity connections and drainage etc. The responsibility for providing such movable assets and utilities would need to be appropriately assigned to the private operator or the public authority.

Set up of control room: A control room serves as a centralized center for capturing ITS data, as also for broadcasting passenger information in the terminal. Setting up and operation of the control room would need to be assigned to the appropriate party.

Set up of booking/ enquiry counter: This involves the setting up and operation of the booking/ enquiry counter, including its staffing and equipping.

III. OPERATIONS AND MANAGEMENT

Maintenance of utilities: Utilities within the bus terminal such as drinking water facilities, public conveniences etc. need to be operated and maintained.

Parking/ entry fee management: This activity involves management of all types of charges to be collected from bus terminal users, including entry fee, day parking charges (per hour basis for buses as well as private vehicles), and night parking charges.

Leasing for commercial exploitation: Space within the bus terminal apart from that used for terminal operations may be leased out for commercial exploitation such as development of shopping complex, supermarts, hotel, offices etc. The activity of leasing out such space would need to be performed by either the public authority or the private player, depending on the type of model.

Security management: Management of security at the bus terminal involves security guards/ barriers at the entry and exit points, as well as security provision for the bus terminal facilities.

Intelligent Transport System/ Public Information System management: Bus terminals function as a point of information provision to passengers regarding inter change modes. Hence, provision of ITS and PIS becomes critical. This involves operation of the ITS system including collection, analysis and display of information.

Revenue collection: This involves the activity of collection of revenue from the various identified sources including user charges, advertisements and rental income.

Operation of control room: Operation of the control room would include management of the ITS data, and provision of passenger information through various media in the terminal.

7.4.2 PPP MODELS IN BUS TERMINAL DEVELOPMENT AND OPERATIONS

Based on the allocation of responsibilities for the various identified activities in the value chain of bus terminal development and operation, the following five types of PPP models have been proposed:

1. Build Operate Transfer (BOT) model
2. Activity wise contract
3. Composite service contract
4. System Management Contract

I. BUILD OPERATE TRANSFER (BOT)

Under this model, the Authority acquires land and gives it to the operator on a long-term lease basis, for a period (say 30 years) sufficient to allow the developer time to recover investment costs through user charges. The Authority provides specifications regarding the design and layout of the bus terminal, including the Floor Area Ratio and the product mix. The Authority then hires a private player (real estate developer) to construct the bus terminal, operate it over the concession period and then transfer it to the Authority. Out of the developed area, the ground and first floor are retained for operation of the bus terminal, while the remaining floors may be exploited for commercial purposes, as per prevalent rules and regulations. The construction and operational costs are borne by private player, and revenues accrue to the private player. The private player pays an upfront premium to the Authority, as well as a recurring premium. The bidding parameter is the NPV of upfront and recurring premium payable by the private player. The BOT model may be implemented in case of a greenfield bus terminal project, i.e. setting up of a new bus terminal, as well as for a brownfield project wherein an existing terminal needs to be redeveloped and modernized.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under the BOT model is provided below.

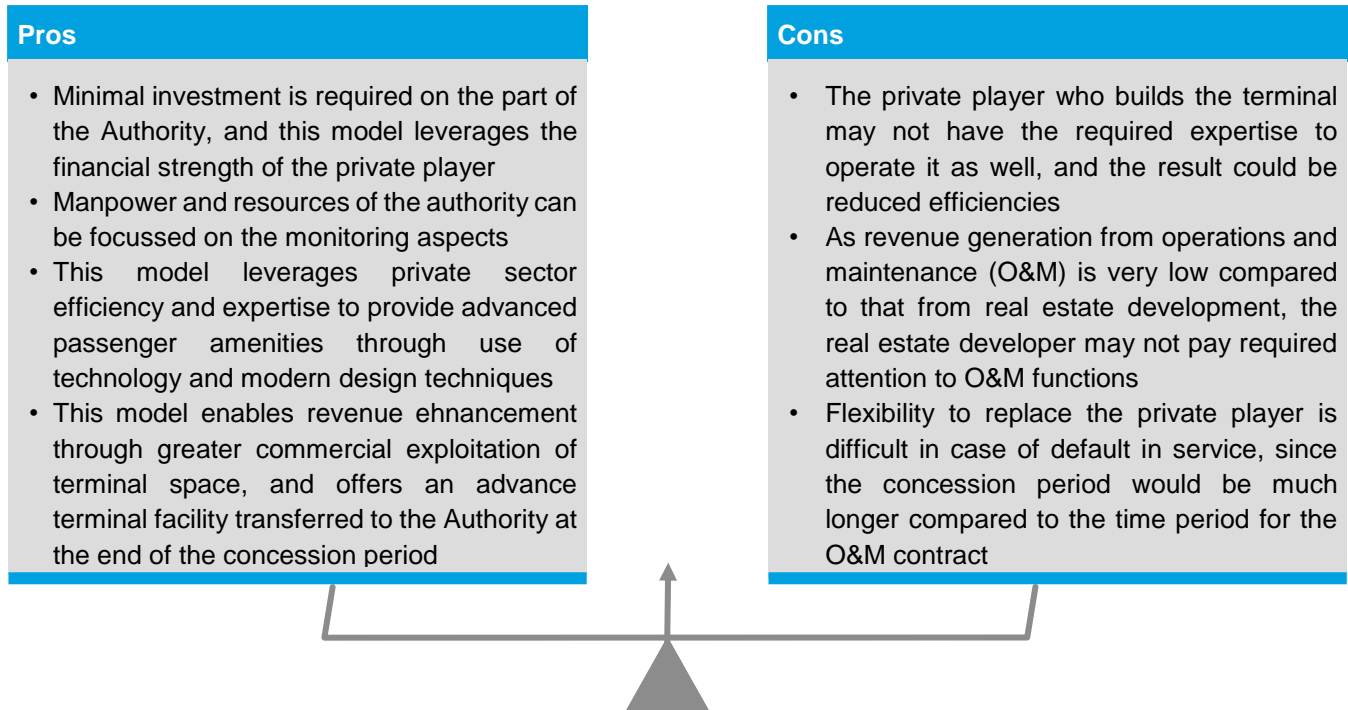
Exhibit 42: Responsibility Allocation under BOT model

PHASE	PLANNING	IMPLEMENTATION	O&M
		MONITORING	
ACTIVITY	Identification of land	Acquisition of land	Maintenance of BT utilities
	Planning of BT layout, design, capacity	Construction of the BT infrastructure	Entry fee management
	Fixation & revision of fees and charges of BT facilities, revenue collection mechanism	Provision of civil infrastructure	Leasing for commercial exploitation (hotels, offices, multi-purpose complex)
	Acquisition of necessary clearances	Provision of movable assets/ utilities	Security management
	Setting service level standards for BT	Set up of control room	Parking management
	Planning for amenities required in the BT	Construction of bus que shelters/ bus bays	ITS/ PIS management
		Provision of office staff facilities	Revenue collection
		Set up of booking/ enquiry counter	Operation of control room

Legend	AUTHORITY
	PRIVATE OPERATOR

PROS AND CONS

The pros and cons of the BOT model are exhibited below.



II. ACTIVITY WISE CONTRACT

Under this model, once the terminal facility has been developed by Authority, each activity in bus terminal operations (parking and entry fee management, security, commercial exploitation of terminal space, advertisement marketing and control, revenue collection etc.) is outsourced separately to private players. Revenue accrues to Authority, and the private operators get paid a fixed pre decided monthly fee. The bidding parameter is the least cost quoted for each activity separately. This model could be used once a terminal facility has been constructed or when the Authority wants to involve a private player for managing operations at an existing bus terminal.

RESPONSIBILITY ALLOCATION

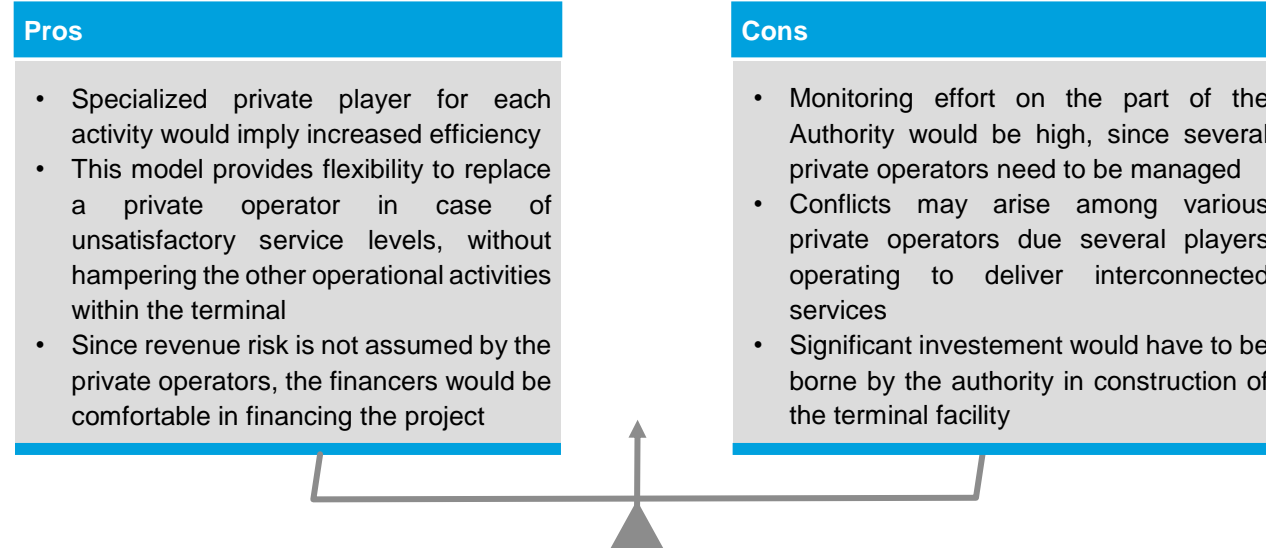
The division of responsibility between the public authority and the private player under this model is provided below.

Exhibit 43: Responsibility Allocation under Activity wise contract model

PHASE	PLANNING	IMPLEMENTATION	O&M
	MONITORING		
ACTIVITY	Identification of land	Acquisition of land	Maintenance of BT utilities (Pvt Op – 1)
	Planning of BT layout, design, capacity	Construction of the BT infrastructure	Entry fee management (Pvt Op – 2)
	Fixation & revision of fees and charges of BT facilities, revenue collection mechanism	Provision of civil infrastructure	Leasing for commercial exploitation (hotels, offices, multi-purpose complex) (Pvt Op – 3)
	Acquisition of necessary clearances	Provision of movable assets/ utilities	Security management (Pvt Op – 4)
	Setting service level standards	Set up of control room	Parking management (Pvt Op – 5)
	Planning for amenities required in the BT	Construction of bus que shelters/ bus bays	ITS/ PIS management (Pvt Op – 6)
		Provision of office staff facilities	Revenue collection (Pvt Op – 7)
		Set up of booking/ enquiry counter	Operation of control room

<i>Legend</i>	AUTHORITY
	PRIVATE

PROS AND CONS



III. COMPOSITE SERVICE CONTRACT

Under this model, once the terminal facility has been developed by the Authority, all operations and management activities in the bus terminal are outsourced to a single private player. The revenue is retained by the Authority, and a fixed pre-decided monthly fee is paid to the private operator. The bidding parameter would be the least cost quoted for performing the composite set of services. This model could be used once a terminal facility has been constructed or when Authority wants to involve a private player for managing operations at an existing bus terminal.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under this model is provided below.

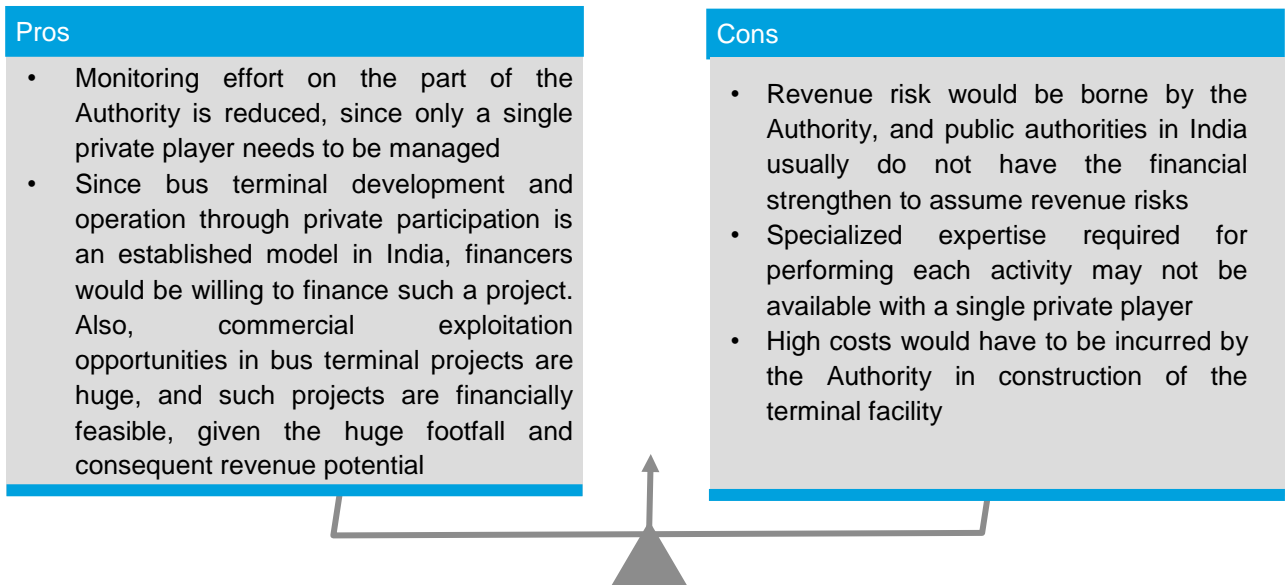
Exhibit 44: Responsibility Allocation under Composite contract model

PHASE	PLANNING	IMPLEMENTATION	O&M
		MONITORING	
ACTIVITY	Identification of land	Acquisition of land	Maintenance of BT utilities
	Planning of BT layout, design, capacity	Construction of the BT infrastructure	Entry fee management
	Fixation & revision of fees and charges of BT facilities, revenue collection mechanism	Provision of civil infrastructure	Leasing for commercial exploitation (hotels, offices, multi-purpose complex)
	Acquisition of necessary clearances	Provision of movable assets/ utilities	Security management
	Setting service level standards for BT	Set up of control room	Parking management
	Planning for amenities required in the BT	Construction of bus que shelters/ bus bays	ITS/ PIS management
		Provision of office staff facilities	Revenue collection
		Set up of booking/ enquiry counter	Operation of control room

Legend	AUTHORITY
	PRIVATE

PROS AND CONS

The pros and cons of the composite service contract are exhibited below.



IV. SYSTEM MANAGEMENT CONTRACT

Under this model, upon construction of the bus terminal facility by the Authority, a competent private operator is given complete responsibility for the operation and management of the bus terminal, as per standards set by the Authority. Operational costs are incurred and revenue is collected by the private operator. The bidding parameter is the System Management Fee payable to/by the Authority. This model could be used once a terminal facility has been constructed or when the Authority wants to involve a private player for managing operations at an existing bus terminal.

RESPONSIBILITY ALLOCATION

The division of responsibility between the public authority and the private player under this model is provided below.

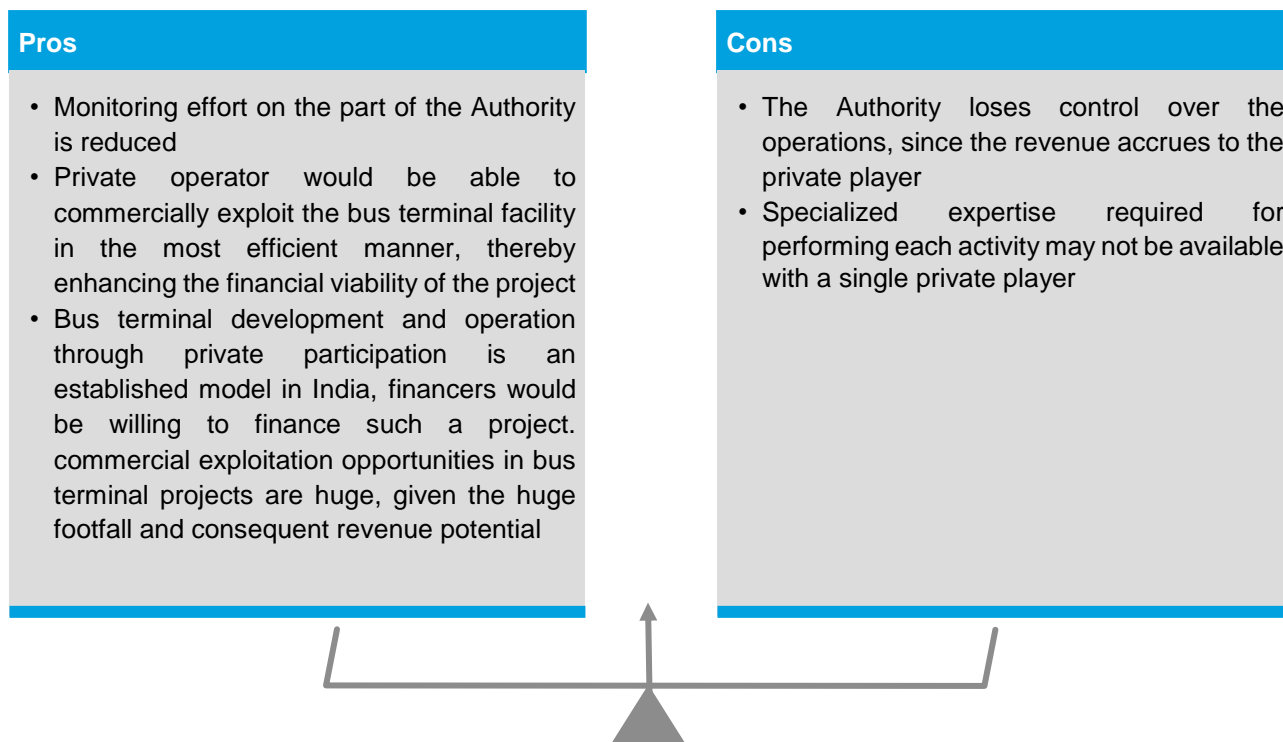
Exhibit 45: Responsibility Allocation under System Management Contract

PHASE	PLANNING	IMPLEMENTATION	O&M
	MONITORING		
ACTIVITY	Identification of land	Acquisition of land	Maintenance of BT utilities
	Planning of BT layout, design, capacity	Construction of the BT infrastructure	Entry fee management
	Fixation & revision of fees and charges of BT facilities, revenue collection mechanism	Provision of civil infrastructure	Leasing for commercial exploitation (hotels, offices, multi-purpose complex)
	Acquisition of necessary clearances	Provision of movable assets/ utilities	Security management
	Setting service level standards for BT	Set up of control room	Parking management
	Planning for amenities required in the BT	Construction of bus que shelters/ bus bays	ITS/ PIS management
		Provision of office staff facilities	Revenue collection
		Set up of booking/ enquiry counter	Operation of control room

<i>Legend</i>	AUTHORITY
	PRIVATE

PROS AND CONS

The pros and cons of the System Management Contract are depicted in the adjoining diagram.



FINANCIAL ASSESSMENT

Capital cost estimate: Life Cycle Capital cost estimates are provided for construction of a medium size (five acres i.e. 20,000 sq mtrs) bus terminal.

COMPONENT/ACTIVITY	Unit	Value	Costs per unit (INR)	Total Cost (INR)	Remarks/ Assumptions
Civil construction	sq m	20,000	24,000	960,000,000	1. 5 acre (20,000 sq m) bus terminal size, FAR :2; construction cost per sq m = INR 24,000 2. Bus terminal capacity : <ul style="list-style-type: none"> a. 1000 intercity and 500 interstate bus trips, entry / exit daily; b. 120 ECUs parking space c. 20,000 footfalls in terminal daily 3. Terminal Operational span 0600-2200 hrs. 4. Terminal space distribution: <ul style="list-style-type: none"> a. Building area: 4000 sq m a. Area for Bus Bays / BQS: 8000 sq m b. Parking space: 6000 sq m c. Open, greens, circulation space: 2000 sq m
Bus Queue shelter / Bus bays construction	Nos	50	2,000,000	100,000,000	25 BQS / bus bays each for Intercity and Inter-state bus trips

Terminal Equipment, fixtures, control room, etc.	Lump sum	Lump some	25% of BQS capex	25,000,000	As life of BQS, other equipment etc. is of 10 yrs, investments would be required to replace such assets twice during project life cycle of 30 yrs.
Total Life Cycle Capex				1,085,000,000	Additional Rs100+250 =1250 Lakhs to be invested for items at 2 and 3 above during 11th and 21st year of terminal life. Considering above investments, Total life cycle capital invested would be Rs13,350 lakhs

Operation and maintenance cost estimate: Life cycle depreciation, and other operations related cost estimates are provided for operation and maintenance of a 5 acre bus terminal.

COMPONENT/ACTIVITY	Total Life Cycle Cost (INR)	Remarks/Assumptions
Life cycle Operational cost	3,572,700,000	1. Life cycle operational costs including depreciation on buildings and other assets comprise of: <ol style="list-style-type: none"> Depreciation on buildings taken over 30 yrs life, on straight line basis & nil residual value, Depreciation amount Rs 9600 lakhs. Depreciation on other assets for life of 10 yrs, Straight line method, nil residual value, amounting to Rs 3750 Lakhs. These assets are replaced every 10 yrs at the end of their serviceable life; Capital cost for such replacements considered at current prices Cost of borrowed funds estimated for a debt : equity ratio of 2:1, loan period of 10 yrs at an interest rate of 12%; Cost of Staff assessed as Rs 3600 lakhs for an average staff strength of 50 personnel at an average monthly cost to the employer as Rs 20,000 per staff. Cost of utilities and other overheads -- assessed as Rs 5400 lakhs @ 150% of staff costs. Maintenance cost of Assets per annum @ 2% of value of assets estimated as Rs 8100 lakhs.
Total Opex	3,572,700,000	Includes life cycle Depreciation of Rs 13,350 lakhs of all assets, leaving life cycle cost of operations and Maintenance as Rs 22,377 lakhs, average annual opex excluding depreciation as Rs 7,45,90,000 and average annual expenses inclusive of Depreciation as Rs 119,090,000.

Revenue estimate: Life cycle revenue estimates are provided for the revenues arising from operation of bus terminal as well as its commercial exploitation as per details given here-under.

SOURCE	Total Life cycle Revenue (INR)	Remarks/Assumptions
Rental income from commercial spaces such as kiosks, restaurants, etc. in terminal	216,000,000	Life cycle rental value from commercial spaces in terminal area @ Rs 500 per sq m per month on 30% of Ground floor area (=4000*0.30) of terminal used for pax.
Parking revenue	394,200,000	Parking places in terms of Equivalent Car Space (ECS) @50 sq mtr per ECU : 120 i.e. 20 buses (=60 ECUs) and 60 ECUs of private vehicles, Available parking space-time (space hrs) as 2880 daily; Utilization factor of parking space-time as 50%; Rate of Tariff per ECS parking time per unit period as Rs 25.
Terminal user tariffs	1,143,200,000	Daily Entry exit of 500 Interstate and 1000 city buses, each bus considered equivalent to 3 ECUs; and additionally 720 ECUs of private vehicles; Entry fee charged as @ Rs 20 per ECU per entry.
Advertisements	164,300,000	Total BQSS 50, Advertisement spaces time (space hrs) on BQS daily as 11,200; Advertisement Space utilisation factor of 25% and Advertisement Rate per space-hour as Rs 50
Rental income from mall/ commercial complex	2,880,000,000	Area available for commercial use as 32,000 sq m, rental value per sq m per month as Rs 250
Total Revenue	4,797,700,000	Average annual revenue = Rs 159,923,333

Life cycle revenues from bus terminal operations turn out to be significantly higher than capital expenditure and operation & maintenance costs combined, thus rendering bus terminal projects financially viable. Average annual revenue is also higher than average annual operation and maintenance costs, thus indicating that the project is financially sustainable.







7.4.3 EVALUATION OF PPP MODELS PROPOSED

Each of the proposed PPP models has its own pros and cons, and different models may be suitable in different contexts. The models have been evaluated on diverse parameters to ascertain their viability and a comparative assessment has been made.

7.4.4 CONCLUSION

Following qualitative evaluation of various models against diverse parameters, the models and or combination of the models are likely to be viable and attractive both for private proponent as also the authority in order of preference indicated hereunder: Build Operate Transfer (BOT) model, Activity wise contract, Composite service contract, System Management Contract

Exhibit 46: Parameter –wise feasibility of PPP models for bus terminal projects

	BOT	Activity wise contract	Composite contract	System management contract
 Operational efficiency	Low, since the real estate developer who constructs the terminal may not have expertise in operational aspects	High, since specialized private players operate various activities	Low, since a single private player operates all activities	Low, since a single private player operates all activities
 Investment Requirement	Huge investments to be borne by the private player, does not require any costs to be borne by the Authority	Authority needs to invest in construction of the terminal facility, operational costs to be borne by private player(s)	Authority needs to invest in construction of the terminal facility, operational costs to be borne by private player	Authority needs to invest in construction of the terminal facility, operational costs to be borne by private player
 Access to finance	Easy, since bus terminals offer huge revenue potential, and project sustainability is not a major concern	Easy, since bus terminals offer huge revenue potential, and project sustainability is not a major concern	Easy, since bus terminals offer huge revenue potential, and project sustainability is not a major concern	Easy, since bus terminals offer huge revenue potential, and project sustainability is not a major concern
 Incentives for private player	Medium, since a private player that builds the real estate and terminal building may not be keen to operate it as well	High, since the private player with expertise in a particular activity would be willing to provide that service	Low, since a private operator may not be interested in delivering a composite set of services	Low, since a private operator may not be interested in delivering a composite set of services
 Project viability	High, since the private player would be able to exploit the terminal commercially and make the project viable	High, since a specialized private player would be contracted for commercial exploitation of the terminal	Low, since a specialized private player is not contracted for commercial exploitation of the terminal	Medium, since the private player would be able to exploit the terminal space commercially, given the building built by the Authority
 Suitability	When Authority is not financially strong, and wants to leverage private sector expertise	When Authority wants specialized private operators for each activity and it has robust monitoring capacity	When Authority lacks adequate monitoring capacity and wants to retain revenue	When Authority wishes to transfer revenue risk to the private player

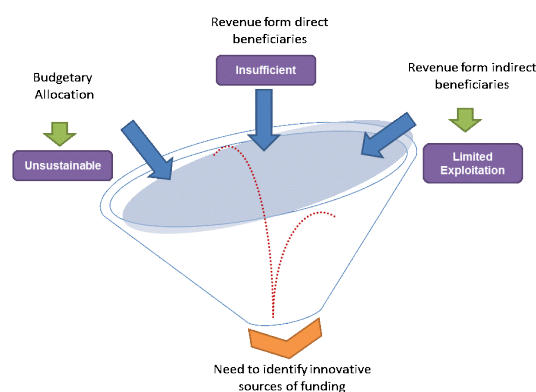
8. FINANCING OPTIONS

In the previous chapters, various PPP options for the selected five urban transport infrastructure projects have been discussed. Some of the options are commercially viable, but in some cases government funding support either in the form of grant or subsidy is required to make the project viable and attract private sector investment. It has been noted that the funds available with city authorities/State Governments for development of various urban infrastructure projects are often inadequate to meet the project requirements. In this case, generating additional revenue from direct and indirect beneficiary is quite important. City authorities/state government need to identify some possible innovative and dedicated sources of financing which can be adequate and sustainable to meet the project requirements. In this context, this chapter outlines the need for creation of funding mechanism to generate innovative sources of funding and similar initiatives in India are highlighted.

8.1 NEED FOR CREATION OF FUNDING MECHANISM

It is understood that, currently, there are three main modes of financing in urban transport infrastructure exists: income generated from user charges, revenues from non-transport commercial activities, and government subsidies/budgetary allocations. Government budgetary allocations to a city today are unknown, uncertain and unpredictable. The budgetary allocations for the urban transport sector are made through the Consolidated Fund of the State. The state needs to strike a balance between various social and political commitments through scarce financial resources. Therefore, the flexibility of resource allocation for the urban transport infrastructure sector could reduce.

Exhibit 47: Need for innovative funding sources



Income generated from user charges are based on social and political considerations and seldom cover the full cost of the service provided. User charges are most important sources of non-tax revenues for urban transport agencies. There has been a tendency to charge for various services at rates that are much lower than the actual costs. This led to poor cost recovery, poor maintenance and inadequate investments in the infrastructure. Situation of some of the cities across the world are presented in the box below.

User Charges insufficient to meet transport finance requirements

In France, contributions from users cover only 25% of the operating costs of the public transport systems. The contribution rate varies according to the size of the systems: from 21% in systems with fewer than 100,000 inhabitants to 33% in those with over 300,000 inhabitants 13.

In Istanbul, the coverage rate for the bus system operated by the firm IETT is 64%. However, this falls to only 41% when amortization and provisions for equipment replacement are included.

In Ho Chi Minh City, public subsidies cover around 45% of the system's operating costs (all public, private and cooperative bus companies).

Source: Deloitte research.

Considering this situation some of cities in India and across world have taken several initiatives to generate additional sources of fund for development of urban transport infrastructure. The cities have planned to generate fund out of betterment levy on land in areas which benefit by investment in urban transport infrastructure projects; rationalization of parking-fee, property development tax, property development on the land banks with para-statals, advertisement revenue on transit corridors, employment tax (as done in France) etc. Some of the potential sources of funding, which can be used to supplement the financial resources available with cities to attract provide sector investment are discussed in the following sections.

8.2 POTENTIAL SOURCES OF FUNDING

Some of potential sources of funding that are currently being used and some innovative sources of funding are described below.

SOURCES OF FUNDING FROM PUBLIC AUTHORITIES: Traditionally the financing of urban transport projects in the country has largely been confined to gross budgetary support from the government and the user charges. These sources will continue to be the major sources of funding. Some of the key possible funding sources which can be used for funding urban transport infrastructure projects are described below.

- Central Government Resources:** Central government allocates funds to the state government and cities for development of various infrastructure projects including urban transport infrastructure projects through budgetary resources. Also, the funds received by the state government under centrally sponsored schemes of the Government of India, such as AMRUT, Smart city initiatives which are also intended for development of urban transport infrastructure in a particular state could be used to fund the PPP project.
- State Government Budgetary Resources:** Since development of urban transport infrastructure is a state subject, hence the state government is primarily responsible for meeting the funding requirements for urban transport sector. State government allocates funds to various agencies involved in operation and management of urban transport infrastructure through plan and non-plan allocations. Some proportion of budgetary allocation can be allocated specially for PPP projects.
- Funds from ULBs:** Funds allocated to the ULBs for management and operations of urban transport can be dedicated for PPP projects.
- Earmarking of certain percentage of existing Transport User Charges:** There is inconsistency in budgetary allocation from the sources of funding discussed above, so it is quite difficult to predict the fund availability. To address this issue, Finance Department can earmark pre-decided percentage of Transport User Charges, which are currently part of state government's consolidated fund to attract private sector investment.
- Earmarking of Fund from National Urban Transport Fund:** To meet the huge funding requirements in the urban transport sector, the Working Group on Urban Transport has recommended to be set up National Urban Transport Fund (NUTF). Apart from meeting capital needs, this fund will cater for possible support to certain systems during the operations stage too. Certain percentage of NUTF can be earmarked for promoting/taking up of PPP projects. Proposed sources of revenue for the NUTF are presented in the diagram below.

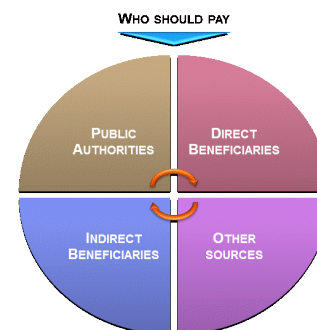
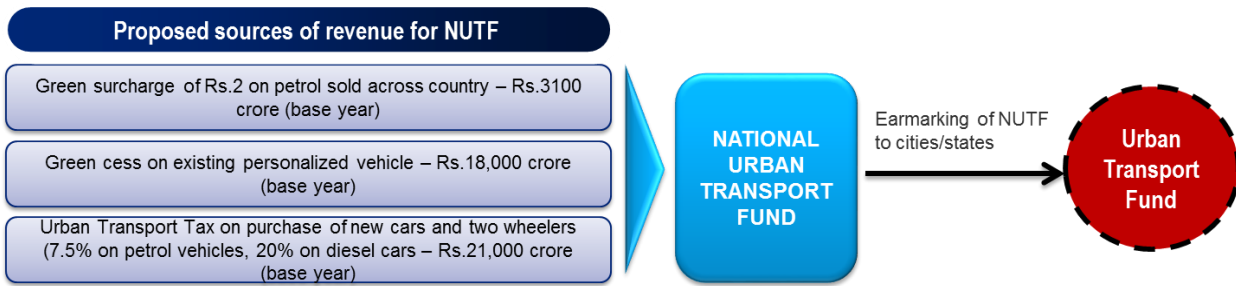
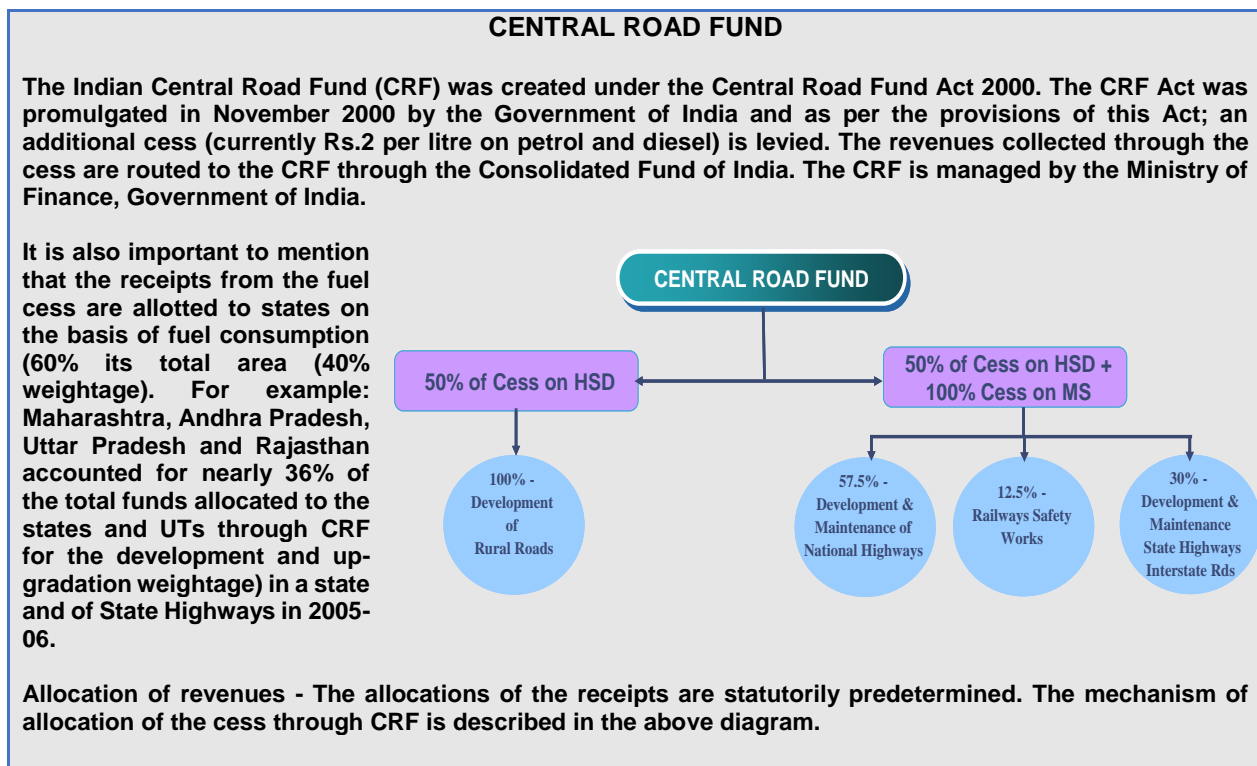


Exhibit 48: Proposed sources of funding for NUTP



The above levies have been suggested to generate dedicated pool of resources for taking up urban transport projects and also to serve as a great disincentive for use of personalized vehicles. A similar arrangement has already been done by Government of India for meeting the funding requirements of the road sector.

Exhibit 49: Central Road Fund



Due to relative lack of appreciation of heavy investment needs of urban transport and conflicting demands on the general exchequer, the sources of funding discussed above may not be sufficient to address the funding requirements. Also, unless the funds are earmarked for the promotion of PPP these sources are usually unsustainable and unpredictable. Under this circumstance, additional/innovative resources need to be generated. Some of the possible potential sources of revenue which can be utilised for promoting PPP project are discussed below.

ADDITIONAL & INNOVATIVE FUNDING OPTIONS: Since the huge investment needs at Central/State Government level, cannot be met from traditional budgetary sources alone, innovative financing mechanisms will, therefore, require to be tapped. In addition to budgetary resources, the main source of direct funds is the user charges. The level of affordability of a large section of society does not permit full cost recovery through user charges. Learning from the global examples, on

the "polluter pays principle" (the party responsible for polluting the environment pays for the damage done), additional sources of funding needs to be identified. Some of the innovative sources of funding that can be leveraged to make a PPP project viable are indicated below.

- **Betterment Levy:** A betterment levy is charges on increase in value of property not due to the action of the owner (such as would be the case with renovations and improvements) but from a community action, thus justifying the public authorities to impose such a tax. This could be charged on land registration, conversion of land and increase in property tax etc. This type of levy can be imposed along the bus corridor for city bus private operations, BRT projects and Bus terminal projects. The fund generated can be used for city bus project.
- **Additional Cess on Transport Fuel sold in Urban Settlements:** Under this mechanism, cess on transport fuel i.e. petrol and diesel can be levied on the fuel sold in urban settlements. Putting extra cess on transport fuel can be considered to generate additional revenue for the city authority.
- **Additional cess on Vehicle registration (personal vehicles):** Vehicle registration charges, is the charges imposed at the time of the ownership of the vehicles. It is proposed to impose an additional cess on the vehicles at the time of its registration. This is similar to the direct user charges, as this is levied on the vehicles that would use the new infrastructure built in the city. This sources of funding can be utilised for funding all type of urban transport infrastructure projects.
- **Naming rights** is the selling of the right of naming public infrastructure such as street infrastructure, corridor areas for corporate sponsoring for a certain period of time. It has the potential to be a reliable and predictable source of revenue for any infrastructure type such as bus terminal, street infrastructure, PBS etc. It is observed that internationally this mode is used towards the payment of debt services. For example, the Southeastern Pennsylvania Transportation Authority (SEPTA) recently entered into a naming rights contract with AT&T to change the name of the Pattison stop, at the end of the heavily travelled Broad Street Line, to AT&T Station.
- **Parking Charges:** Parking charges can be one of the potential sources of revenue for the city authority to control mobility, but if it is to be effective, the parking policy must be streamlined with all other transport policies. Paid parking must be viewed as a means of charging motorists for occupying space on urban roads, but can also be used as a method to encourage a modal shift, and as a source of income. Additional cess on existing parking charges can generate revenue to support various projects.
- **Cess on Property taxes:** Development of urban transport infrastructures such as street infrastructure, bus corridors etc. results in substantial increase in property values close to the development areas. It makes sense to get a share in the benefit accruing to the property owners. Considering this an additional cess on property taxes may be proposed. Such cess could be collected by the concerned Municipal Corporation, along with the property tax, and then transferred to the concerned agencies responsible for development of urban transport infrastructure projects.
- **Tax on Employers:** Urban transport infrastructure is vital to economic activity within a region. It plays a key role in encouraging business development by providing employees with daily access to their workplace, giving clients access to sales outlets, and facilitating the delivery of goods. Viewed in this light, it is only natural that companies and business activities should contribute to funding public transport. One of the most successful cases in recent

history has been the success of France using what is known as Versement Tax (Tax on Employers), which has approximately funded 40% of total expenditure on urban transport. In the Indian context this can be examined as one of the potential source of revenue to fund various urban infrastructure projects.

- **Borrowings Loans and grants:** Borrowing is one of the most common forms of investment funding used by local authorities and governments. The lender, whether public or private, national or international, will require guarantees that can be provided by public institutions (central government, public banks, etc.) or mechanisms such as the allocation of a share of revenue stream to a guarantee fund.
- **Advertisement Revenue:** Revenue received from putting advertisement in premises, roads, stations and on public transport vehicles can also be partially used to support a PPP projects. This sources has been elaborated in the previous chapters.
- **Leveraging revenue stream:** The various sources of funds identified above are mostly revenues that would keep flowing into the concerned authorities or to a dedicated fund. Given the requirements of funding for urban transport infrastructure, these revenues would not be sufficient to fund all urban transport infrastructure needs. Moreover since capital intensive development projects often require huge funding, such revenue stream cannot fund such projects on its own. For example, bus terminal development, BRTS, or any bus projects require very high capital funding and usually external funding is required. The continuously flowing revenue stream discussed above could be used as security for such funding. It is also envisaged that such revenue stream should be able to raise funds from commercial banks and capital markets (by way of issuance of bonds etc.).

8.3 SIMILAR INITIATIVES

The NUTP recognises that, in order to address urban transport problems, huge capital investments are required. The 12th five year plan, estimates the total investment for urban transport to be over 3 lakh Crore. Huge capital investments for developing mass transit systems such as BRTS, metro rail, monorail or segregated rights-of-way for cycles and pedestrians put a substantial financial burden on the government. It is evident that most state governments and local bodies do not have the needed financial strength and therefore, alternative methods of financing are required.

As recommended in the NUTP, states and cities are being encouraged to set up Urban Transport Fund (UTF) in order to receive dedicated revenues to be used exclusively for meeting the needs of urban transport. The NUTP mentions some of the potential revenue sources for such UTFs, which include a supplement to the petrol and diesel taxes, a betterment levy on land owners, and tax on employers etc. The MoUD has recommended the creation of a dedicated UTF at both state and city levels. Some cities namely Surat, Indore, Ahmedabad, Bangalore, Pimpri Chindwad have set up UTF. The common issues faced by the cities which has proposed for setting up of UTF is identification sources of revenue and designing the administrative procedures to collect the funds. The exhibit below shows the timeline along which the various UTFs have developed.

Exhibit 50: UTF initiatives by various Indian cities

STATE	CITY	YEAR OF ESTABLISHMENT	NAME OF TRANSPORT FUND	KEY SOURCES
Andhra Pradesh	Hyderabad	2011	Urban Transport Development Fund (UTDF) – Proposed	25 paise surcharge per litre of vehicular fuel sold in HMDA area; 10% of road tax; 100% of penalties collected by traffic police
Karnataka	Bangalore, entire state	2010	Dedicated Urban Transport Fund	Budget allocation, 1% of Cess on motor vehicle tax, 2% of Cess on property tax
Rajasthan	Jaipur, entire state	2012	Rajasthan Transport Infrastructure Development Fund	Cess on one time tax – levied on motorized vehicles under Rajasthan motor vehicles act, 1951; Cess in the form of Green tax – imposed on registration of old / new vehicles; Cess on Stamp duty; Funds from Central / State governments; Funds from Industry for carrying out social responsibilities; Any other funds as decided form time to time.
Madhya Pradesh	Bhopal, entire state	2012	Dedicated Urban Transport Fund	Income from transport revenues; Advertising revenues; Parking revenues; Congestion charges; Traffic Rule Enforcement income; Betterment levy; TDR; Portion of property tax; Fuel tax; Road charges etc.
Uttar Pradesh	Lucknow, entire state	2014	Dedicated Urban Transport Fund	0.50% of the registration Fee amount (Fee realized from Revenue generated from registration of deeds under the Registration Act 1908.
Maharashtra	Pimpri-Chindwad	2009	Pimpri-Chindwad Municipal Corporation Urban Transport Fund	A premium on Transfer Development Rights (TDR); Charges for advertising on the BRT corridors; Development charges for building permission; Incremental property tax; Lease on utility ducts, etc.
Maharashtra	Pune	-	Pune Municipal Corporation Urban Transport Fund	Penalty in the name of special charges from violators; Tax from properties related to transportation; New vehicle registration tax ; Encroachment penalties; Advertisement

Among the initiatives that have already been taken, some states have established UTFs for metropolitan areas while some have set up UTF at the state level. The states having either initiated or proposed such a fund include Rajasthan, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Gujarat, Maharashtra, Andhra Pradesh and Karnataka.

Considering the above initiatives, to make selected urban transport infrastructure projects viable and to attract private sector investment fund generated through additional sources could be used to supplement the existing financial resources of the city authorities.

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