



# PUBLIC TRANSPORT

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## VOLUME 3 - CASE STUDIES AND EVOLVING PRACTICES GUIDE

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

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The Ministry of Housing and Urban Affairs is the apex authority of Government of India to formulate policies, coordinate the activities of various Central Ministries, State Governments and other nodal authorities and monitor programmes related to issues of housing and urban affairs in the country. The Smart Cities Mission was launched by the Ministry in 2015 to promote sustainable and inclusive cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions.



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The World Resource Institute is a non-governmental global research organization that aims to protect earth's environment and provide for the needs and aspirations of current and future generations, including but not limited to improving the quality of life in cities, by developing and scaling environmentally, socially, and economically sustainable urban transport solutions, with capabilities to identify and implement such solutions in over fifty countries including within Europe, United States, Mexico, Brazil, Indonesia and India.

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## 1. Case Study 1: Thiruvananthapuram City Roads Improvement Project on Annuity Basis

Enactment of Kerala Road Fund Act in 2001, making provisions for setting up a 'Road Fund' outside the consolidated fund of the State and constituting a Board for its administration. The Act also provided for collection of user charges by private companies. The Road Fund was to be constituted of 10% of motor vehicles taxes, tolls collected under the Kerala Tolls Act of 1986 and contributions from the Central Road Fund. Rules were issued in 2003 for carrying out the provisions of the Act.

Constitution of the Kerala Road Fund Board (KRFB) in 2004, to mobilize funds for road infrastructure, approve PPP arrangements and allocate funds (subsidies/annuities) from the Fund to private players in road projects. The Road Fund formed the primary source of annuity payments under the Thiruvananthapuram City Roads Improvement Project (TCRIP). All major city roads, including important National Highway Bypasses needed improvement in terms of widening, improvements in strength of road surface, improvement of pedestrian pathways and signage.

### 1.1. Project Conceptualization

Urban Roads are typically constructed and maintained through small construction contracts with short liability periods in case of defects. As a result, most such projects are fraught with piece-meal improvements and poor quality of construction, leading to frequent repair and maintenance of the same stretches of roads.

TCRIP attempted a 'life cycle' approach to road improvement, making the Concessionaire responsible for long-term maintenance of the roads, thereby ensuring better quality of services. The project envisaged expanding, strengthening and upgrading some of the arterial roads of the city, keeping in mind the likely growth in traffic over the next decade and was structured on an annuity (semiannual) basis, since tolling within

the city was not feasible. The annuity was to be paid through the Kerala Road Fund so as to provide additional assurance to private agencies, as against the normative practice of budgetary allocations that are made one year at a time.

### Project Development

Annuity payments to the Concessionaire were to be made from the Road Fund. For this purpose, extensive financial analysis was conducted, and plans were prepared in due consultation with various related departments (including the Finance Department). A Detailed Project Report (DPR) was prepared through a Technical Consultant<sup>1</sup> and involved preparation of technical designs, drawings, and estimation of costs.

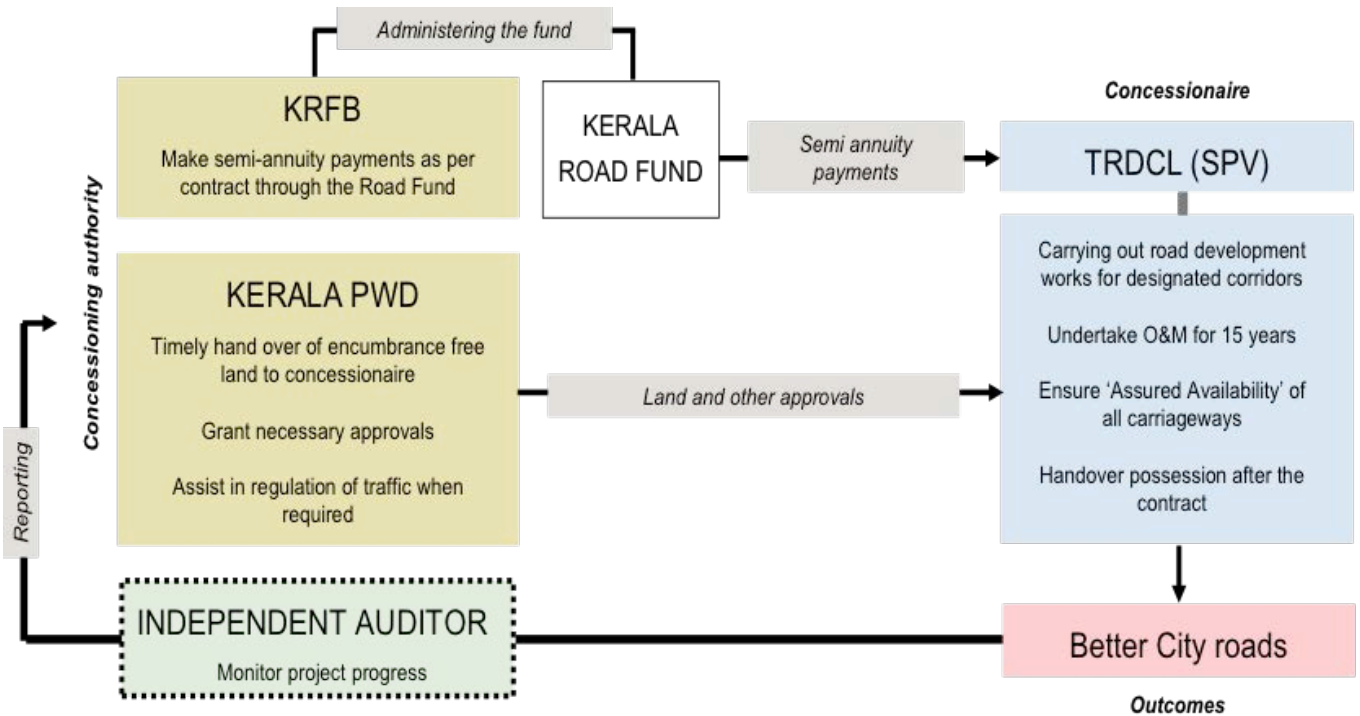
### Procurement Procedure

Procurement of Concessionaire for the TCRIP was based on a two stage (RfQ and Rap) competitive bidding process. The project was awarded in March 2004 to an SPV called Thiruvananthapuram Road Development Company Limited (TRDCL) formed between IL&FS Transportation Networks Limited and Punj Lloyd Limited, based on their quote for lowest annuity amount (bid parameter).

<sup>1</sup> Infrastructure Development Corporation (Karnataka) Limited (IDeCK)



## 1.2. Contractual arrangements



## 1.3. Operator output obligations

TRDCL was responsible for carrying out the following works as part of its obligations:

- Widening of 12 corridors (total length of 42km) including 2-laning of a total stretch of 4.9km, 3-laning of 13.1km, 4-laning of 17.2km and 6-laning of 6.8km.
- Geometric improvement and strengthening of the road surface
- Improvement of 65 junctions – including flyovers at two junctions and an underpass at one junction
- Improvement or replacement of existing culverts and minor bridges
- Provision of 2m wide footpaths, signalized pedestrian crossings, and signage including destination boards, solar based traffic signals, and high mast lighting.
- Provision of 94 dedicated bus bays, offset from the main carriageway
- Provision of storm water drains, new street lights and roadside tree plantation
- Reorganizing existing utilities (telephone and electric lines etc.) so as to avoid future road cutting
- TRDCL had to complete work within 30 months and undertake Operation and Maintenance (O&M) for the next 15 years based on O&M requirements specified in the contract.

In order to ensure that the entire carriageway (under the project scope) was available for use during the O&M phase, the contract specified the total number of 'Lane kilometers' (156.75 lane km) for which the Concessionaire had to ensure 'Assured Availability' within each annuity period. Lane km was calculated as the total length of all lanes within each road stretch (thus lane km for a 3-lane corridor was calculated as 3 times the length of the road). Stretches were deemed unavailable if the same were closed for traffic use or if the riding quality thereof had deteriorated below levels prescribed as per the O&M manual.

Handover possession of project facilities in good operating condition at the end of the project.

## 1.4. Obligations of the concessioning authority

Obligations of the Concessioning Authority included peaceful and timely handover of land for the purpose of carrying out works as per committed schedule, granting relevant approvals, and assisting the Concessionaire in tasks such as regulating traffic whenever required.

## 1.5. Regulatory and monitoring arrangements

In the absence of a sector regulator the project is monitored as per contract by the Kerala PWD through an Independent Auditor appointed for the purpose.

### 1.6. Project financials

The Concessionaire was responsible for all investments required to fulfill contractual obligations.

Recovery for the Concessionaire was envisaged through annuity payments of Rest. 18 Crore from the Road Fund. Deductions could be made in the annuity amount based on factors such as delay in completion of works, default in 'Assured Availability' (elaborated in 3.2 above) during the O&M phase, etc. There was also a provision for enhancing the annuity amount in case of early completion of works.

### 1.7. Project risks and allocation

#### Construction Risk

Including time and cost overruns due to contractor default, was borne by the operator. Overruns due to delays in handover by PWD were borne by PWD.

Though designs were provided by the PWD, the responsibility for accepting/modifying these (design risk) so as to suit outcome specifications was borne by the Concessionaire

#### Investment Risk

Investment risks in the project were mitigated through a fixed annuity payment structure, assuring regular returns to the Concessionaire.

#### Performance Risk

Borne by the operator through mechanisms for penalties for non-compliance with contractual commitments such as Assured Availability and project timelines and through a performance guarantee.

#### Policy Risk

The Concessions Authority bore all responsibility for changes in policy regime or scope of the project and all related remuneration thereof.

### 1.8. Disputes resolution mechanism

All disputes were to be resolved amicably through direct discussion between the parties involved. In the event of non-resolution, the dispute was to be settled through arbitration processes as prescribed under the Arbitration and Conciliation Act, 1996.

### 1.9. Partnership in practice

The TCRIP is the first city roads improvement projects to be structured on a PPP basis and is unique in its use of a Road Fund for ensuring annuity payments to the private operator.

However, the project has experienced a series of legal issues and time delays, primarily on account of the inability of the Kerala PWD to make land available in time.

### 1.10. Project outcomes

The following outcomes have been achieved under the project as of January 2010:

#### Status of Construction Works

Shifting of utilities - 95% of electric lines completed and shifting of other utilities is in progress.

A total of 3357 seedlings were planted to compensate for the trees cut during road widening processes.

### 1.11. Project shortcomings

Kerala PWD has not been able to hand over land (free of encumbrances) as per its obligation in the concession agreement, resulting in severe project delays (detailed in 4.3 below) and repeated renegotiations of the contract.

### 1.12. Legal/contractual issues

The full stretch of land required for project execution was to be handed over free of all encumbrances before November 2005. However only about 14km was actually handed over leading to a pre-termination notice by TRDCL in July 2006. Following a series of negotiations, the first Resumption Agreement was signed in January 2008. However, the balance land was still not made available to the Concessionaire. Following the delay, the Concessionaire claimed compensation on grounds of extended stay. The matter was referred to an Arbitration tribunal, which granted an award of Rs.124.947 Crore in favor of TRDCL.

A second Resumption Agreement was executed in May 2009 for completing the balance 28km stretch (works for the 14km land made available prior to the first Resumption Agreement had been completed as Phase I). As per the agreement, Phase II involves works for 18km stretch to be completed by November 2010 and Phase III involves completion of works for the remaining 10km stretch by May 2011. Around 99% of the project land has now been handed over to the Concessionaire and work is presently underway

### 1.13. Lessons learned

The project highlights the possibility of undertaking unusual urban sector projects – such

as development and maintenance of 'within city' road projects through PPP arrangements. The project also highlights the importance of making the Concessionaire responsible for long term maintenance of the infrastructure so as to ensure the quality of services obtained through such arrangements.

The need for creating a dedicated funding mechanism, such as the 'Road Fund' created in Kerala for the TCRIP project, to increase the comfort level of the private sector for participating in such projects - particularly when the payment is structured as a fixed annuity to be paid by the Concessions Authority. Importance of structuring operator remuneration in a way that monitoring is in-built into the mechanism and quality services are ensured. In this case the linking of annuity payments in O&M phase with factors such as 'Assured Availability' of the entire carriageway acts as a monitoring device.

Timely provision of land is one of the key requirements for achieving desired project outcomes within fixed timelines. In the TCRIP the failure of the PWD to secure and hand over land as per its time commitments has severely affected project outcomes and resulted in additional financial liability (through compensation) for the Concessions Authority. The importance of gaining possession of adequate land before committing to the contractual obligation cannot be understated.

The issue of delay in handover of land also highlights the importance the Concessions Authority's compliance with its own commitments. In this the failure of the PWD has resulted in extra financial liabilities for the Authority and resulted in wastage of public money.

*Source: National PPP Capacity Building Program*

## 2. Case study 2:

### Development of modern bus terminal at Amritsar, India

The Punjab Infrastructure Development Board (PIDB) was constituted in 1998 with a mandate to develop and facilitate infrastructure development in the State. Since its inception the Board has developed several projects for the transportation sector and has actively promoted private participation in such projects. The Modern Bus Terminal project at Amritsar was developed and contracted out by PIDB on behalf of the

Department of Transport (DoT), Government of Punjab.

The existing facility in Amritsar was built in 1963, was old and dilapidated and had been declared 'unsafe' for occupation in 1992. The facility was nevertheless being used (through ad-hoc addition of reinforcing columns) for want of an alternate facility. The existing facility was not equipped to accommodate the growing needs and growing scale of operations resulting from an increase in the bus and passenger traffic. The facility also suffered from a lack of adequate and quality amenities for passengers.

#### 2.1. Project conceptualization

Given the importance of efficient bus transport for facilitating tourism in the city and the need for ensuring better transit facilities for bus traffic along the busy inter-State GT road, it was necessary to create an improved terminal, which would both cater to the expanded traffic needs and provide better amenities for passengers. It was decided to engage a private operator for the construction and long-term maintenance of the proposed facility, in return for revenues accruing from user charges, advertisements, and lease of commercial spaces.

#### 2.2. Project development

PIDB undertook the process of project development on behalf of the DoT, including feasibility and traffic studies, preparation of technical specifications and development of the concession framework. The RfP issued also included an indicative design, the use of which was optional for bidding companies.

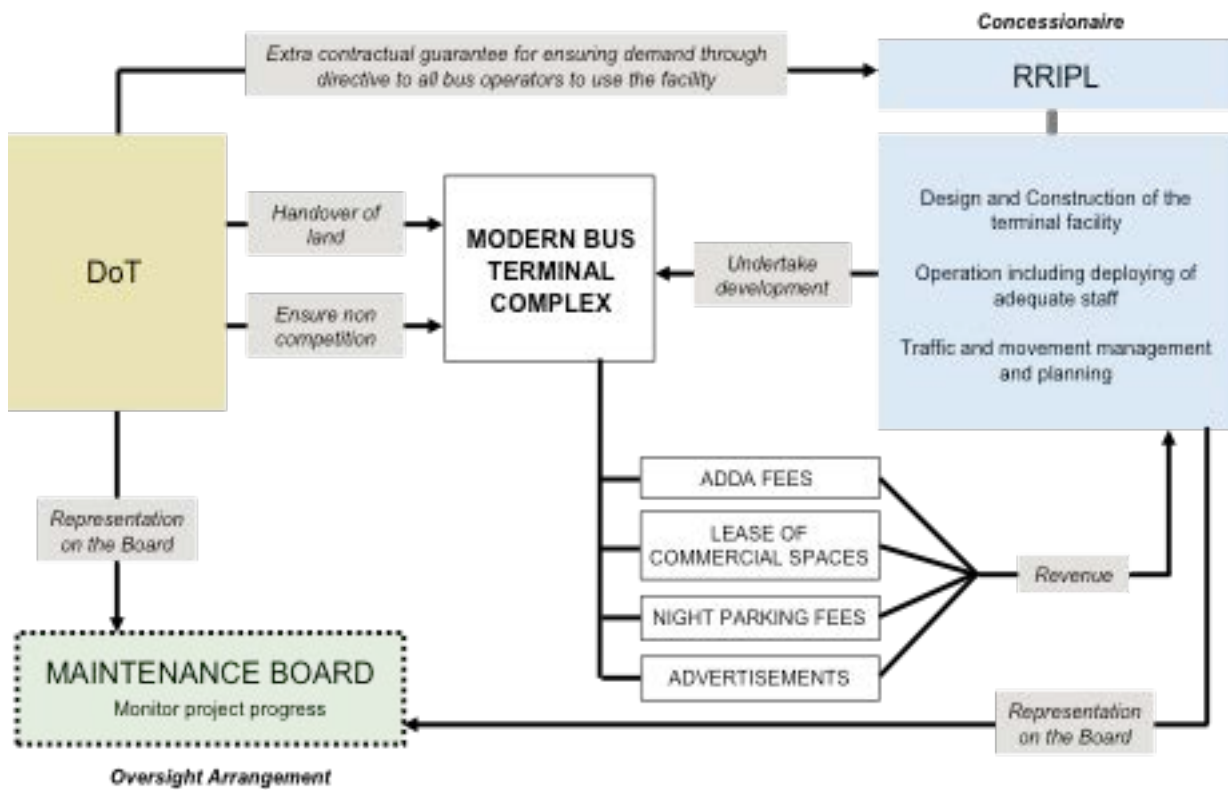
#### 2.3. Procurement procedure

The DoT with the assistance of PIDB undertook the process of selection of Concessionaire through a competitive bid. Bidders were required to have completed at least one project of minimum value of Rs.5 Crore or two projects of minimum value of Rs.2 Crore each in the past 5 years in sectors such as real estate, airports, public utility buildings etc. The contract was awarded in February 2004 to a Special Purpose Vehicle (SPV) called Rohan and Rajdeep Infrastructure Private Limited (RR IPL), formed between three companies: Rohan Builders (India) Pvt. Ltd., Rajdeep Buildcon Pvt. Ltd. and Rajdeep Road Developers Pvt. Ltd. The operator was selected on the basis of their lowest bid for the concession period (bid parameter) of 11 years and 5 months.



## 2.4 Contractual arrangements

Figure 1 | Proposed Contractual Structure



## 2.5. Operator output obligations

The contract granted the Concessionaire rights for the design, construction, operation, and management of the Bus Terminal. The Concessionaire was thus responsible:

To provide and maintain the following facilities:

- A total covered area of 170,495 sq. ft and a bus circulation area of 155,420 sq. ft
- Facilities for bus traffic including 8 embarkation bays, 53 disembarkation bays, 48 idle/overnight parking bays and 2 tolling booths at bus exit points.
- Amenities for passengers including a passenger concourse of 57,228 sq. ft, toilet blocks, water fountains, waiting rooms, restaurant or cafeteria, inquiry and ticketing booths, and seating berths.
- Office space and staff amenities for Punjab Roadways
- To complete the construction of the facility within 18 months of award of the contract
- To deploy adequate skilled staff for managing the operations of the terminal as per specific performance standards and evolve a detailed operation and maintenance (O&M) manual for the purpose.
- To regulate the bus, pedestrian, and intermediate passenger vehicles movement

within the respective areas designated for the purpose inside the terminal

- To handover the terminal facility in good operating condition and free of cost to the DoT at the end of the contract.

## 2.6. Obligations of the concessioning authority

• Obligations of DoT as per the concession agreement were as follows:

- Peaceful and timely transfer of the existing facility (90 days) to the Operator and provision of necessary assistance (free of cost) for obtaining various clearances
- Development and management of an interim facility during the construction of the new facility and prompt discontinuation of the temporary facility upon issue of completion certificate to the new terminal.
- Redeployment of all staff working at older bus terminal facility
- Honoring the non-compete clause included in the contract, preventing the DoT from creating any new facility within a distance of 10 km, or allow any other party to do so for 10 years.

## **2.7. Regulatory and monitoring arrangements**

The Concession provided for the constitution of a Maintenance Board consisting of representatives of the DoT, the District Magistrate, representatives of the Concessionaire and the Works Manager/Assistant Mechanical Engineer. The representative of the DoT was to act as the Chairman of the Board, which monitored compliance with the O&M manual, reviewed periodic reports, and approved modifications and variations.

An independent engineer was also appointed to monitor project progress and report to the Maintenance Board.

## **2.8. Project financials**

- All investments for construction and maintenance of the facilities, including operation of the facility, were to be made by the Concessionaire. Cost of the temporary facility was borne by DoT.
- Recovery of investments made by the Concessionaire was envisaged through the following:
  - Collection of Adda (parking) fees on a daily basis from both private and public bus operators for use of the facility. Periodic increase in fees over the contract period was stipulated in the concession agreement
  - Collection of Night Parking fees - Periodic increase in fees over the contract period was stipulated in the concession agreement
  - Lease/Rental of commercial areas (shops and kiosks of an area of 2,696 sq. ft and offices of an area of 11,767 sq. ft), which were developed as part of the facility
  - Advertisement revenue accruing through a total hoarding area of 5200 sq. ft
  - Other revenues accruing from passenger charges and use of public amenities

## **2.9. Project risks and allocation**

### Demand Risk

Associated with forecasting the level of traffic using the facility was entirely borne by the Concessionaire. The Concessions Authority mitigated the risk through the non-compete clause and through issuance of a Government Order directing all buses operating in Amritsar to halt, take up and set down passengers at the Terminal.

### Construction Risk

Including cost and time overruns for completion were borne by the Concessionaire. No relaxation in contract duration (period of use and revenue retrieval for the Concessionaire) was permitted in case of delays due to Concessionaire default. Post construction defects emanating from faulty design/execution were also to be borne by the Concessionaire.

### Operating Risk

Borne by the Concessionaire since O&M was to be conducted on the basis of an approved O&M manual and supervised periodically by the Maintenance Board

### Performance Risk

Borne by the Concessionaire through a Performance Security valid throughout the period of the concession (to be invoked in case of termination due to Operator default)

### Force Majeure

The Concessionaire was protected through commensurate extensions in the concession period or in the event of termination through appropriate termination payments.

## **2.10. Disputes resolution mechanism**

The Concession Agreement called for resolution of disputes through direct discussion between the parties involved. In the event of non-resolution, the parties were required to submit the dispute for adjudication to the Punjab Infrastructure Regulatory Authority (PIRA) constituted under the Punjab Infrastructure (Development and Regulation) Act, 2002. Also, in case the PIRA had not been appointed at the time of the dispute, the parties could resort to arbitration in accordance with the Arbitration and Conciliation Act, 1996

## **2.11. Project outcomes**

The project has been successful in meeting most of its requirements, including construction and operationalization of the new facility within the stipulated time frame, providing services to an expanded load of buses and providing better facilities for passengers.

## **2.12. Project shortcomings**

The DoT has not been able to enforce compliance of bus operators with its order directing that all buses will have to use the new facility. Several bus operators avoid stopping at the terminal in order to avoid Adda fees. As a result, the Concessionaire

has not been able to realize expected revenues, a problem further compounded by inadequate demand for the commercial spaces built into the terminal.

The Operator has not been able to efficiently carry out regulation of movement within the terminal leading to frequent traffic jams within and in the vicinity of the bus terminal. This may also be a result of the lack of adequate co-ordination mechanisms between the agencies regulating traffic within (operator) and outside the terminal (city traffic authorities). Also, the information system for passengers is weak and lacks audiovisual facilities.

The Oversight arrangements through the Maintenance Board have not been adequate with slippages from both the Concessionaire and the Concessions Authority.

### 2.13. Legal/contractual issues

While the project has not run into any major disputes (contractual or otherwise) the implementation period has been fraught with problems such as issuance of completion certificate by the independent engineer without the approval of the Concessions Authority, dissatisfaction of the operator regarding the lack of enforcement by the Government of its Order directing all bus operators (public and private) to use the terminal facilities etc.

### 2.14. Lessons learned

Need for public agencies to honor their commitments (even if they are extra-contractual) so as to ensure project success. In this case the inability of DoT to enforce its order directing all bus operators to use the facility led to losses for the operator.

This could be mitigated in the future if demand risk (which cannot be controlled by the private party) is retained by the Concessions Authority, which is the competent Authority for enforcing compliance by all bus operators with directives regarding compulsory use of the new terminal. In such cases a fixed remuneration (for the user fees component) could be committed to the Concessionaire in addition to revenue accruing from commercial leases, advertisements etc. Need to set more stringent technical criteria during the process of selection of Concessionaire. As elaborated in 2.3, the eligibility criteria were restricted to experience of bidders as contractors/

developers for developing projects of a certain value. The criteria did not include any prior experience or expertise in traffic management or regulation. This could be the reason for inadequate traffic management and resultant traffic bottlenecks in the case.

One possible manner of mitigating such issues could be that the Concessions Authority retains the responsibility of planning and traffic management within and outside the terminal, given its technical expertise to do so efficiently. The project can also be structured differently to include a team of traffic management experts, either as part of the Concessionaire's team or as a separate third entity within the contract, integrated with the surrounding traffic management through a strong coordination mechanism.

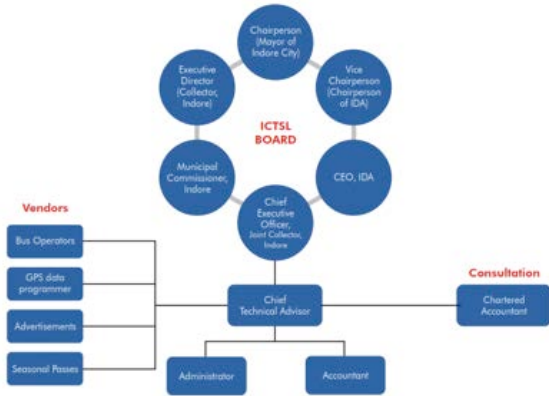
*Source: PPP Toolkit for Improving PPP Decision-Making Processes*

## 3. Case study 3:

### Structuring City Bus Service on PPP: Indore City Bus, India

One such example of PPP in city bus operations is in city of Indore, where Indore City Transport Services Limited (ICTSL) is in charge of providing transport services. There are six members on the Board of ICTSL, with the Collector of Indore District as its Executive Director entitled to exercise his powers to ensure the effective management of the new bus transit system. ICTSL concentrates mainly on planning, implementing, setting service quality standards, monitoring performance and outsourcing operations, revenue collection, and so on, to private companies in a transparent manner. ICTSL is nested within the government, but enjoys decision-making autonomy in matters of technical operations, finance, and management. This implies that the SPV is eligible to receive funds from the central and local governments along with being able to generate its own revenue.

Financial autonomy allows for an internal balance of costs and revenues, restricting the outflow of resources from the system beyond sustainable levels. ICTSL operates as a public-private partnership by way of granting route permits to private bus operators to run their buses in the city.

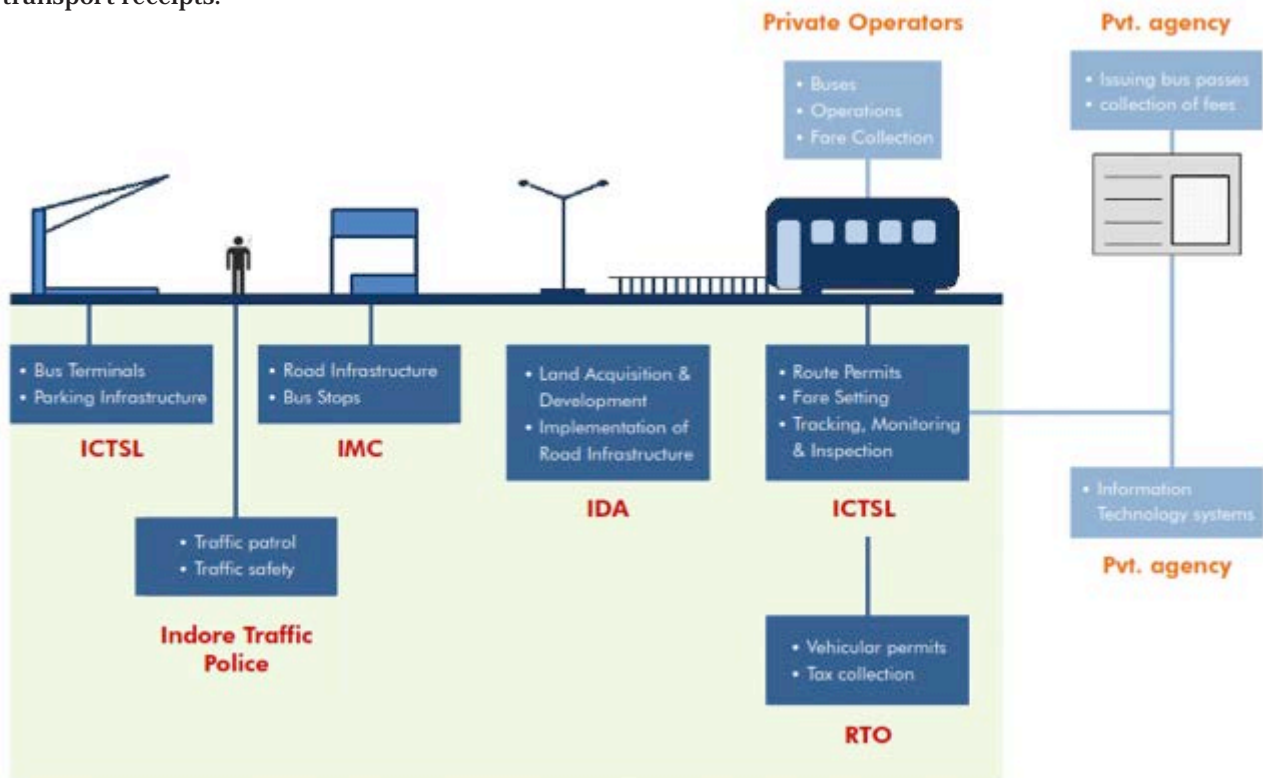


ICTSL is the special purpose vehicle that acts as the nodal agency for the development and operation of an integrated multi modal transit system, including BRT in the Indore Metropolitan Area. The road ownership for the entire right-of-way remains with the IMC. The maintenance of motor vehicle lanes, cycle tracks, and other general road amenities is also the responsibility of the IMC. It will be paid through revenue generated from enhanced property taxes and receipts from additional FAR provided along the BRT corridor. Bus shelters and bus lanes will be maintained by ICTSL through its share of public transport receipts.

Under the Public Private Partnership model, the public agencies are in charge of infrastructure provision, service regulation, tracking, supervision, and performance monitoring. Bus operations, ITS, issuance of seasonal passes, and fare collection are contracted to private vendors based on an open bidding process. ICTSL has made office space available for each of the private bus operators within their own city premises. This allows for good communication between ICTSL and the operators. Conflicts are identified and resolved in less time due to the healthy relationships between these actors. ICTSL also includes suggestions from bus operators in planning decisions. For instance, suggestions from operators were incorporated into the design of the schedule for the new fleet induction.

The operators own the bus fleet and pay for the upkeep of the buses themselves. The fleet size of the private operators varies from 2 to 50 buses. The existing contracts are valid for a period of five years and are renewable for a further period of two years at the discretion of the company. The issuance and collection of monthly pass fees is performed by a private vendor under a contractual agreement with ICTSL.

Revenue from the passes is shared between the private operators, who receive 60 percent of the amount collected, and ICTSL, who receives the remaining 40 percent.





## 4. Case study 4: Examples of Fare Revision: Bangalore Metropolitan Transport Corporation (BMTc)

BMTc operates all bus services in the city of Bangalore, and fares are based on a stage system, with a telescopic structure. In other words, fares increase as distance increases, with the cost per marginal unit of distance decreasing as the trip length increases. Each stage is approximately equal to 2 km, although they can be shorter on particular routes. BMTc operates several differentiated services, each with its own fare structure. These services are:

Figure 2 | Fare structure through 10 stages for these different services

Service	Description
Ordinary	The basic city bus service. Accounts for the vast majority of routes and fleet
Big10	A high-frequency trunk service, running on the 12 major arterial roads in Bangalore. This is the first step in a proposed direction-based trunk-and-feeder service for Bangalore, as opposed to the current destination-to-destination configuration
Vajra	A high end air-conditioned service initially designed to serve high-income professionals working at IT and other office parks
Suvarna	A branded service with higher quality buses - positioned between Ordinary and Vajra services
Pushpak	Another branded service with high-quality vehicles with a one-person. driver only operation
Atal Sarige	A service designed for lower-income users, with lower fares and routes connected low-income settlements to commercial areas

Figure 3 | Fare Structure through 10 Stages

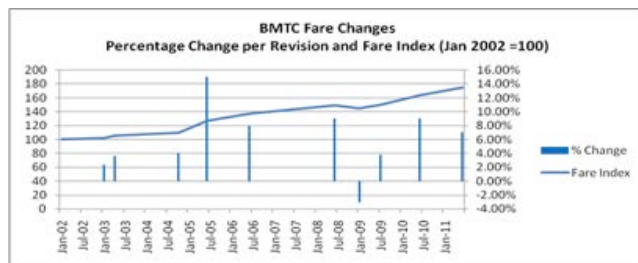
Stages	Ordinary	Big10	Vajra	Suvarna	Atal Sarige
1	4	4	10	5	2
2	7	7	10	9	3
3	9	9	15	10	4
4	11	11	20	11	5
5	12	12	25	12	6
6	12	12	25	13	6
7	13	13	30	13	6
8	13	13	35	13	7
9	15	15	35	14	7
10	15	15	40	15	7



## Historical Fare Structure

Figure 18 below displays the historical changes in BMTC fare rates (price per km).

Figure 4 | **BMTC fare changes**



The graph shows that the price per km travelled of public transport in Bangalore has increased by about 75 percent in the past decade. BMTC fares have been changed 11 times, roughly once per year on average. With respect to fare fixation, BMTC services may be categorized as follows: 'ordinary services' (roughly 85 percent of all services) and 'other differentiated services' (15 percent of all services). In both cases, BMTC utilizes a formula to determine the fare hike (per passenger km) to neutralize the burden of diesel price rise and dearness allowance (DA) hike for STU employees. Thus, the formula is dependent on two factors – fuel prices and staff costs. BMTC conducts a review twice a year to determine whether a change in the fare structure is necessary.

In the case of 'Other differentiated services' (such as Vajra, Atal, etc.), BMTC has the authority to unilaterally change fares as and when it deems fit, without requiring the approval of any higher authority. For 'ordinary services', however, state government approval is required for fare hikes. BMTC makes fare change proposals, which are then taken to the state government for approval via the Principal Secretary of Transport. The State Transport Minister then needs to approve the change in fare structure. Additionally, fare changes can be made either for tickets or passes. BMTC can unilaterally change pass rates, as well as ticket prices for 'other differentiated services'. Ticket prices for 'ordinary services', however, must receive state government approval through the transport minister. The BMTC for this purpose has adopted the ASTRU's formula for fare revision.

### FARE REVISION ON ACCOUNT OF INCREASE IN DIESEL PRICES:

$$F(DPA) = (F - D) + [(RPD/BPD) \times D]$$

Where,

F (DPA) = Revised fare in terms of Paisa per passenger kilometer

F = Average cost per passenger kilometer at the time of previous fare revision

D = Diesel cost per passenger kilometer at the time of previous fare revision

RPD = Revised price of diesel

BPD = Basic price of diesel when the last fare revision was permitted

### FARE REVISION ON ACCOUNT OF RISE IN DA RATES:

$$FR = F + [CPKM(L)/CPKM] \times P \times F/100$$

Where,

F = current fare per kilometer

FR = Revised fare paisa per passenger kilometer

CPKM = Total cost per kilometer at the time of previous fare revision

CPKM (L) = Staff cost per kilometer at the time of previous fare revision

P = Percentage increase in staff cost due to DA increase over the staff cost at the time of previous revision

The advantage of periodic and timely revision is that the fare hike is nominal, and STUs do not incur losses. However,

In order to avoid frequent hike in fares, the government has decided that the fares would be hiked only when the combined burden of diesel price increase and DA hike, as per the formula above, exceeds 0.25 paisa per passenger kilometer (i.e.: total burden exceeds Rs. 11 crores in a year).

Whenever there is a decrease in diesel price, the fare will also decrease.

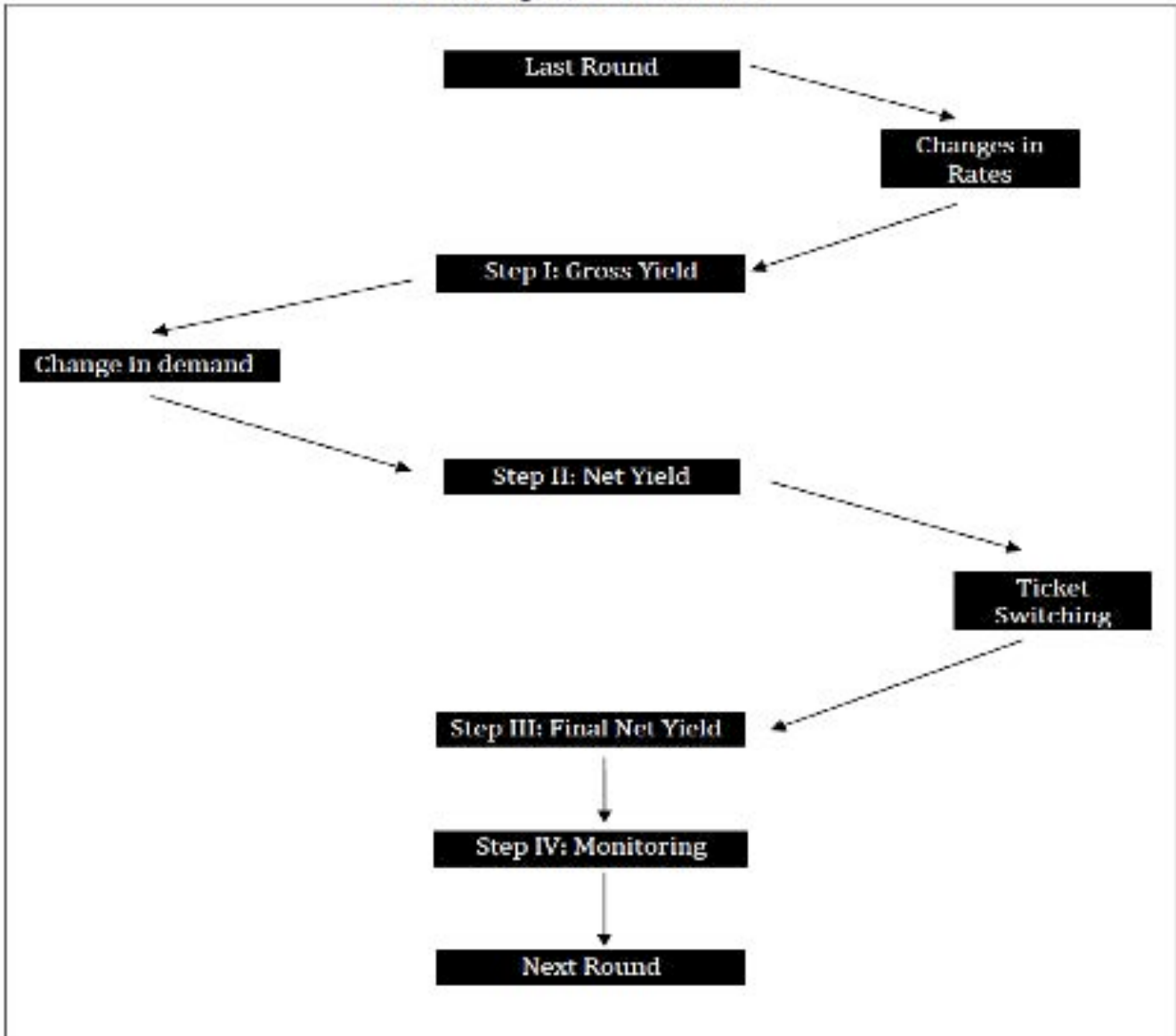
The additional revenue realization on account of fare hike shall not exceed the total increased cost of diesel and DA.

The STU will have liberty of distributing the quantum of fare increase between different types of services such as ordinary, deluxe, express, and luxury.

### CASE STUDY 9: Fare Fixation Policy: London Tube, Transport for London (TfL)

The public transport fare policy has become integral in guiding short- and long-term transport strategies in London. The fare in the London underground is charged on the basis of the 'Zones of Travel'. The Transport for London (TfL) fare structure is based on a spreadsheet model in which revenues and demand estimates are produced and reviewed in four steps. The spreadsheet model subsumes both, Oyster and cash tickets.

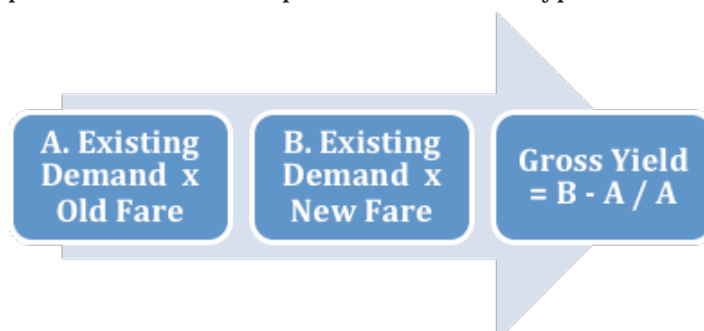
## TfL Underground Fare Model

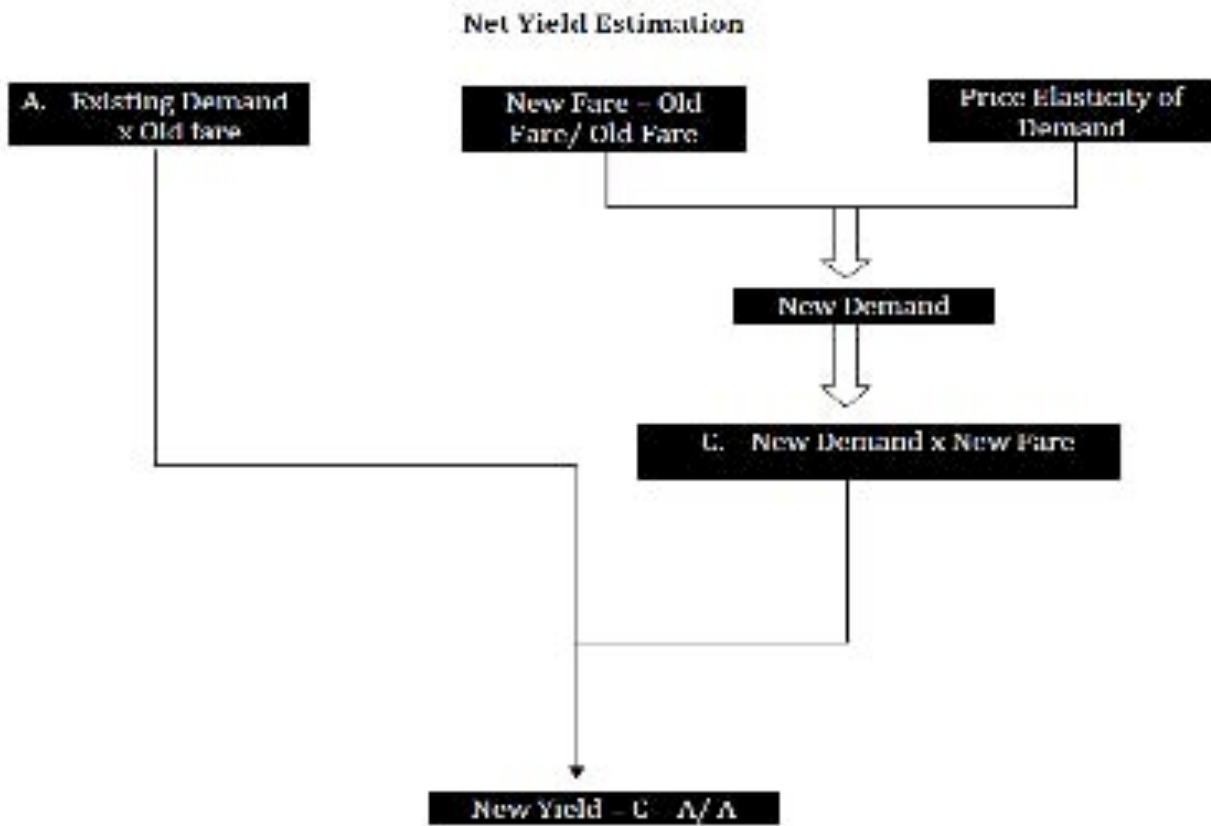


**Gross Yield Calculation:** This step uses base fares, base demand level, and new fares to calculate gross yield (i.e. calculating the change in revenues assuming no change in demand).

**Net Yield Calculation:** This step updates the gross yield estimate produced in first step by accounting for changes within each ticket type but not across each ticket type (i.e. does not account for ticket switching). In this step, own price elasticities are required for each ticket type.

Own price elasticity of a ticket type is the percentage change in demand of that ticket type with given one percent increase in its own price. The elasticity data is fed into the spreadsheet model in order to calculate the Net Yield. The new demand, in turn, is estimated by multiplying the price elasticity for each ticket type by the percentage change in fares for that ticket type.



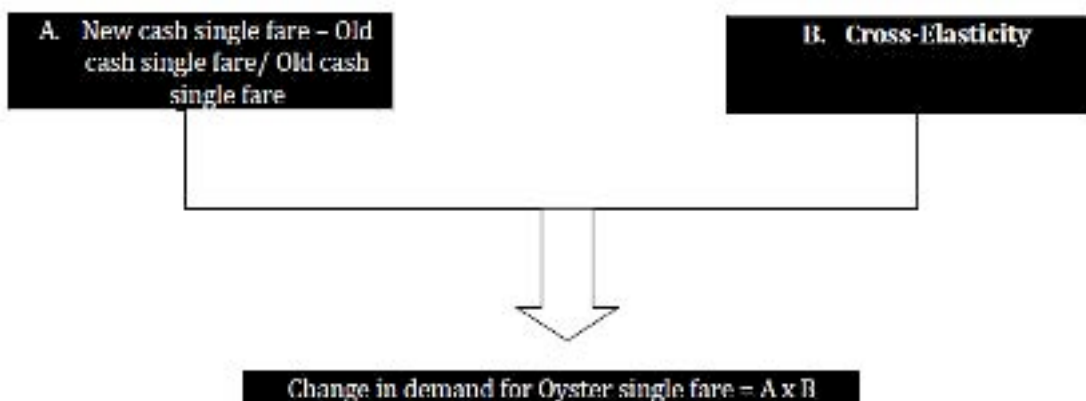


**Final Net Yield Calculation:** In this step, ticket switching is accounted for by using a set of cross-elasticities. The cross-elasticity of demand for ticket type X (Oyster Card) with respect to the price of ticket type Y (Cash Ticket) is the percentage change in the demand of ticket type X resulting from one percentage increase in price of ticket type Y.

**Monitoring:** The estimates produced by the model are monitored on a continuing basis in order to assess the performance of the model. The measure of 'base demand', which is the basic input to the model, is the total monetary value of

ticket receipts for each ticket type. Using pre-determined revenue apportionments, the ticket receipts are allocated amongst various public transport modes (underground, bus, train). The value of ticket receipts is also converted into journeys (i.e. trips per ticket for each mode). Thus, the spreadsheet model incorporated: elasticity of each ticket type, cross-elasticity's that measure potential switching amongst the ticket types, revenue apportionments among different modes, as well as underground, bus, and train trips per ticket per day for each ticket type. Given base demand levels, base fare levels, and new fare levels, the above parameters are applied to estimate pre-determined demand levels.

**Using Cross-Elasticities to Determine Switching from Cash Tickets to Oyster Cards**



	Capital Investment			Operation		
	Public Fund	Private Fund	Fare	Service	Maintenance	Depreciation
<b>Infrastructure</b>						
<b>Roads</b>						
<b>Terminals &amp; Stations</b>						
<b>Depots</b>						
<b>Fleets</b>						
<b>Buses</b>						
<b>Workshop Tools</b>						
<b>Over Supply-Old Buses</b>						
<b>Fare Collection</b>						
<b>Hardware</b>						
<b>Software</b>						
<b>Payment Mode</b>						
<b>BRT Agency</b>						
<b>Control Center</b>						
<b>Staff</b>						

As this case study from Santiago (Chile) illustrates, building permanent citizens' organizations to participate in campaigns and other ongoing initiatives favoring sustainable urban transport can substantially influence public policies and build public support for healthier, more sustainable transport options – and cities. Even when the initial catalyst for citizen organization is a conflict, such as an urban highway project, given financial and technical support from appropriate sources, the “learning by-doing” experiences that result will build active citizenship and necessary skills. In short, a constituency for change should continue to pressure and build new attitudes and infrastructure, and reach out to ordinary people and key policymakers, building bridges across the citizen-policy divide to produce innovative, win-win programs that simultaneously bring change at the micro- and macro-levels (Safaris, 2009). It should be noted that persistence was a key element here.

## 5. Case Study 5 Branding Initiatives

Efforts to brand public transport and communicate information to users were prominent in the industry. Initiatives to upgrade city bus services and introduce BRT systems incorporated strong branding and outreach strategies.

### 5.1. Rebranding the Bangalore City Bus Service

In 2009, the Bangalore Integrated Grid, or BIG Network lead to the rebranding of BMTC's services, which created a distinct identity for the service. The new brand enables users to understand a simple route structure and identify with a visually-uniform bus system. With attractive livery schemes, the bus system gained popularity among users.

#### *Marketing the BRTS in Indore*

As the second ‘complete’ BRT system, Indore's iBus established a new benchmark for marketing and communicating in the public transport

field. The processes adopted by the team were far-reaching and their impacts were successful in gaining the support of the citizens of Indore. Engagement strategies included social media use, specialised focus group sessions, and free trial runs, which were able to create continuous focus on the project, throughout its planning and inception. Ultimately, when the system was launched, ridership along the pilot corridor was double that of initial estimates.

### 5.2. Bhopal BRTS

The first phase of the MyBus system totals 44 kms, with 24 kms presently operational, making it the second-longest operational BRTS corridor in the country (see Figure 9). The corridor is an open system that runs through mixed traffic in some parts of the corridor. The first corridor from Bairagarh to Misrod sees a daily ridership of almost 48,000 passengers in 185 buses (Bhopal City Link Limited 2014).

### Rajkot BRTS

The Rajkot BRTS, or Rajpath, began operation in 2012 with a total planned coverage of 63 kms. The current operational 10.7 kms are served by 10 buses running within a closed system. The second phase includes two additional corridors. In April 2014, the average ridership was around 10,680 passengers per day (Rajkot n.d.). The salient features of this system include the following:

- an automatic door system at bus shelters: to enhance passenger safety at stations
- passenger information systems: to allow passengers to plan their journeys more precisely
- real-time vehicle tracking: to provide for dynamic bus scheduling
- off-board fare payment: to reduce bus waiting times

### 5.3. Ahmedabad BRTS

Janmarg was acclaimed internationally and is acknowledged as the first ‘complete’ BRTS in India. The Janmarg system of Ahmedabad has expanded and currently includes 86 kms of operations. With a 143-strong bus fleet, the system serves 1.3 lakh passengers per day (Ahmedabad Municipal Corporation 2014). The system has median bus lanes and includes three types of services: trunk, complementary, and feeders (Ahmedabad Municipal Corporation 2014). It has all elements of a complete BRTS, including prepayment, overtaking lanes, branding, well designed stations with level boarding, and centralised Information Technology control.

Figure 5 | BRT Systems and Bus Corridors in India







