

# PUBLIC TRANSPORT: LESSONS TO BE LEARNT FROM CURITIBA AND BOGOTÁ

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## ABSTRACT

The public transport systems of South American cities such as Curitiba and Bogotá enjoys recognition as being some of the most successful, and yet cost-effective, ever implemented. The objectives of this paper are to provide a short overview of the Curitiba and Bogotá public transport systems, to evaluate these systems in terms of the objectives set by the NLTTA, and to present recommendations on what South Africa should consider doing to materially improve public transport. In the short overview provided of the public transport systems of Curitiba and Bogotá reference is made to the political dispensation, the history of public transport development, the land use development approach followed, and the use of dedicated bus-ways, stations, pedestrian access facilities and terminals in providing an efficient public transport system. Reference is also made to vehicle characteristics, ticketing systems, other operational matters and the ownership of the system. The paper is concluded with a number of suggestions on how public transport in South Africa could be improved.

## 1. INTRODUCTION

The public transport systems of South American cities such as Curitiba and Bogotá enjoys recognition as being some of the most successful, and yet cost-effective, ever implemented. The World Bank, for example, states its support for the concept of Bus Rapid Transit (BRT) systems and singles out cities such as Curitiba in the earlier years, and in later years Bogotá, for high-quality, and yet cost-effective, BRT services implemented (World Bank).

In South Africa the National Land Transport Transition Act (NLTTA) prescribes that relevant national and international best practice experience should be taken into account when measures relating to public transport are taken. Although a number of South-Africans have visited best practice cities in South-America such as Curitiba in Brazil, and Bogotá in Colombia to a lesser extent, little debate on the lessons to be learnt from these cities have taken place at South African Transport Conference (SATC) level in the past. It is believed that valuable lessons can be learnt from the South American experience.

## 2. OBJECTIVES

The NLTTA clearly states that for the purposes of land transport planning and the provision of land transport infrastructure and facilities, public transport must be given preference over private transport. The objectives of this paper are to provide a short overview of the Curitiba and Bogotá public transport systems, to evaluate these systems in terms of the

objectives set by the NLTTA, and to present recommendations on what South Africa should consider doing to materially improve public transport.

In the short overview provided of the public transport systems of Curitiba and Bogotá reference is made to the political dispensation, the history of public transport development, the land use development approach followed, and the use of dedicated bus-ways, stations, pedestrian access facilities and terminals in providing an efficient public transport system. Reference is also made to vehicle characteristics, ticketing systems, other operational matters and the ownership of the system. The relationship between the public transport system and the management and enforcement accompanying it, will also be discussed.

### **3. CURITIBA: OVERVIEW**

#### **3.1 Political and Economic Situation**

Curitiba is the capital of the Paraná state of Brazil, one of the southern states of the country. Brazil is a federal republic composed of 26 states, with three tiers of government. Each state has its own government structure mirroring that at the federal level, and there are over 5 500 municipal councils (Australian Government, 2).

The national president is elected for a four-year term, with the right to re-election for an additional term. President Luiz Inácio Lula da Silva of the Workers' Party was elected in 2002. The focus of his governance is on improving life for Brazil's poor, while continuing the economic discipline of his predecessors. He enjoys the extensive support of the business sector (Australian Government, 2).

In 2003, Brazil was the world's fifteenth largest economy. Brazil's economy is characterised by large agricultural, mining, manufacturing and services sectors. Industrial capacity is concentrated in the southeast, where Curitiba is also located (Australian Government, 2).

#### **3.2 Public Transport**

Curitiba is a city with approximately 1,6 million inhabitants, covering a total area of 432 km<sup>2</sup>. With a total number of private vehicles of 660 000, current car ownership is at a relatively high level of 410 vehicles /1000 persons (Costa).

Curitiba has one of the most widely reported public transport systems in the world, the reason being its efficiency, while being cost-effective. This system is further considered to be sustainable in terms of a city with significant social challenges and relatively limited financial resources, similar to what is encountered in South African cities.

The Curitiba system was implemented during a political era characterised by unitary government (1964 to 1988). Only from 1988 onwards was a democratic system established.

The success of the public transport system developed over a period approaching 30 years is contributed to (Costa):

- Strong political will and leadership – the role of the three times mayor, Jaime Lerner, should be mentioned here
- Guidance from a specialised land use and transportation planning unit, Urbanização Curitiba SA (URBS) – an organisation with a total staff of 1 730 people
- Control of urban growth by means of a land use masterplan, and the development of high density activity corridors

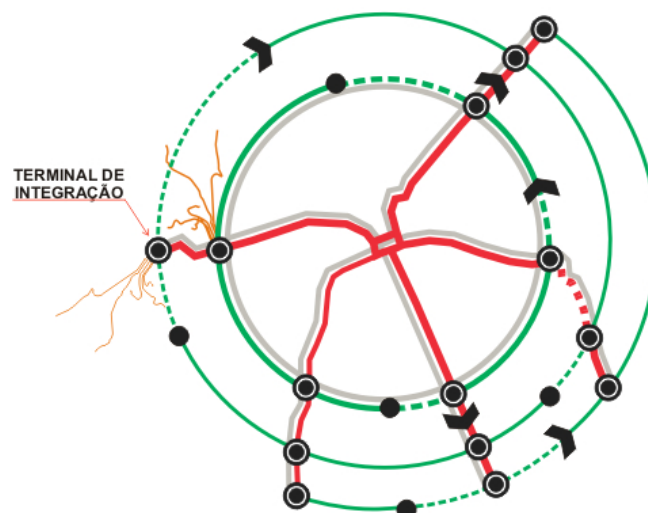
- Provision of a high capacity, dedicated right-of-way bus service for these corridors, combined with circular routes linking the radial routes.

It is also considered that the following played a major role in the success of the system:

- An effective institutional system where the operational planning and public transport law enforcement are the specific responsibility of the municipal unit established for the purpose (URBS)
- A close relationship between short/medium term operational public transport planning and operational unit (URBS) and the strategic land use planning unit (IPPUC).

### 3.3 Bus-Way Network and Infrastructure

Figure 1 shows a schematic layout of the radial and circular routes forming part of the Curitiba bus system. There are five dedicated bus-ways, each between 8 and 12 km long, radiating outward from the city center. The most recent bus-way was completed in 1994 at a cost of USD 1.5 million per kilometer. There are plans to extend the circumferential bus-ways in order to link all key suburban areas to the radial routes (Costa).



**Figure 1. Radial and circular bus routes in Curitiba.**

The basic characteristics of the public transport system are as follows (Costa, Various authors):

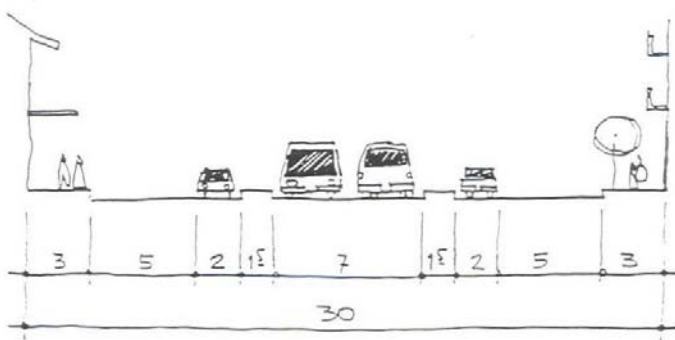
- It has as its core a basic network of exclusive bus-ways (approximately 72 km)
- The system is closed, with a fixed fare to enter it, and once in the system any distance can be traveled without incurring further costs
- A combination of radial and circular routes, with stations along the routes and terminals at the nodal points, facilitate the linkage of trip origins and destinations
- Cross-subsidisation of long routes (used by poor people) by short routes (used by affluent people), as well as of low density routes by high density routes (systems approach)
- Provision of infrastructure by Government, which is approximately 20% of total costs
- The operational part of the public transport system is financially independent.

Figure 2 shows the concept of a bus-way with service roads directly adjacent to it, and the two streets along neighbouring street blocks forming a one-way system (together referred to as a trinary system). Dense commercial and residential development is encouraged along such corridors.



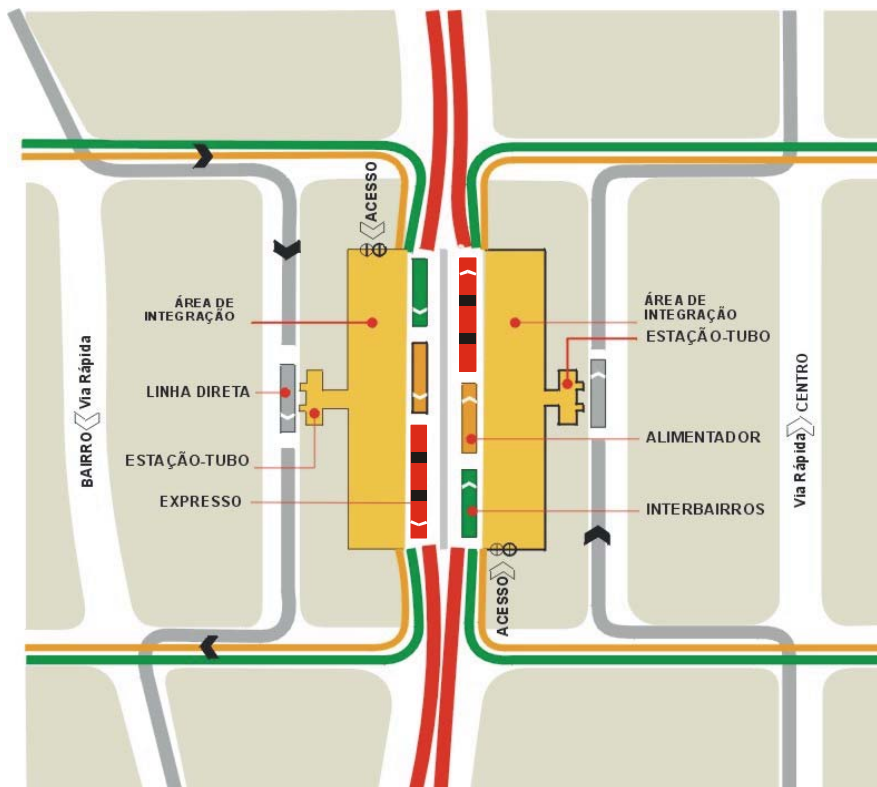
**Figure 2. Corridor development concept: Bus-way and one-way street system.**

Figure 3 shows the typical cross-section of a road with a dedicated bus-way.



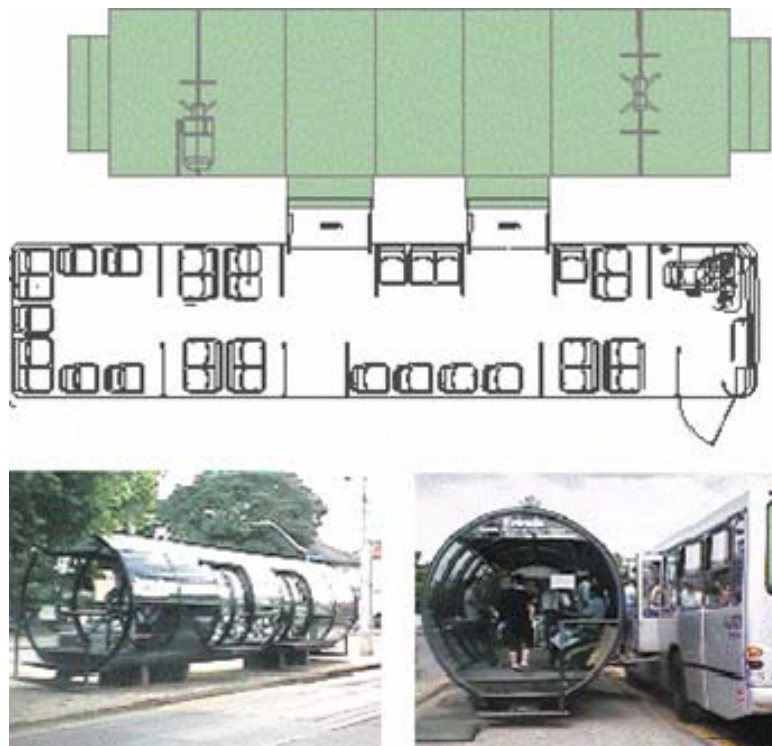
**Figure 3. Cross-section of road with bus-way.**

Figure 4 shows a schematic representation of a terminal. At terminals passengers can interchange between a ring route and a radial route without any additional fare.



**Figure 4. Schematic representation of a terminal.**

Figure 5 shows the layout and appearance of a bus station.



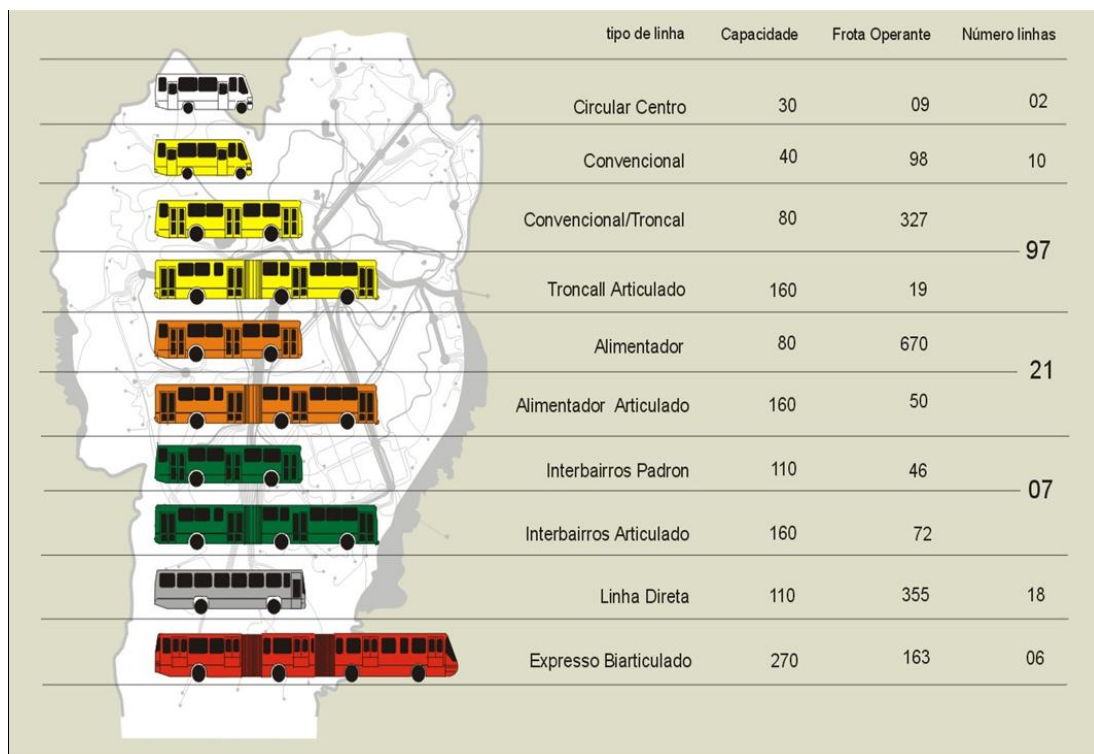
**Figure 5. Example of a Curitiba bus station.**



Success elements of the Curitiba system are pre-payment of fares and level boarding, elements typically found in rail systems, and which enable an efficient boarding and de-boarding process. The high speeds of embarkation and disembarkation results in total stopping time at stations to be short – typically between 10 and 20 seconds. The average speed of buses using the bus-way is 20 km/hr, twice the estimated speed for buses operating in mixed traffic (Costa, Various authors).

### 3.4 Bus Classes

Figure 6 shows the various bus classes forming part of the public transport system, the capacity in terms of passengers, the fleet size per bus type, and the number of bus routes being served by the particular bus type. Of particular interest is the use of a bi-articulated bus with a carrying capacity of 270 passengers, 24,6m long with five doors, and being built by Volvo. This bus is currently only being used in Curitiba.



**Figure 6. Types of buses being used for different functions.**

### 3.5 Management

With regard to the management of the system, URBS, which is an organisation owned by the City of Curitiba, is responsible for planning and management. Strategic planning is undertaken by an institute for urban research and planning, the *Instituto de Pesquisa e Planejamento Urbano de Curitiba* (IPPUC), which consists of specialist planners. As far as can be ascertained, IPPUC is a joint effort between the Mayor's Office, specialists, universities and state and national government. A number of operators are appointed by URBS. URBS determines the routes, schedule of services and characteristics of vehicles required for the different services. URBS also decides on operational norms for operators and monitors the implementation thereof. Operators are compensated based on the kilometre of travel, while a single fare for passengers applies.

The operational side of the system is fully private (and unsubsidised), consisting of 28 operating companies.

The main obligations of the operating companies are to:

- Obtain and maintain a fleet of the prescribed buses
- Contract and remunerate staff for the operation, maintenance and cleaning of vehicles
- Provide the passenger service as prescribed by URBS
- Receive ticket income and pay over to URBS.

The contract with bus operators is for a ten year period, after which it can be renewed (subject to acceptable performance). Each operator is awarded an area of responsibility for bus transport.

With regard to the scale of the operation, Table 1 provides a number of transport indicators for Curitiba.

**Table 1. Curitiba transport indicators (Costa).**

Indicator	Quantum
Population of the city	1 587 315
Area (km <sup>2</sup> )	432,17
Vehicle fleet	655 386
Vehicle ownership (vehicles/1000 persons)	410
Public transport vehicle fleet	2 100
Passengers transported per weekday (trip ends)	2 140 000
Public transport lines	385
Public transport terminals	29
Tube stations	351
Kilometres travelled per day	468 500
Number of operating companies	22

70 percent of commuting in Curitiba is done by public transport (Various authors).

Finally, it is worth mentioning that due to the growth in public transport volumes a high-speed rail option was investigated for a new cross-town public transport corridor to be created. The latest information is that this proposal has been superceded by a high capacity road-based bus system, similar to the existing system.

### 3.6 URBS as Institution

One of the reasons for the success of the Curitiba system, in the opinion of the authors, is the fact that all functions responsible for traffic and transportation have been grouped together into a single organization.

Apart from top management, URBS consists of three directorates:

- Traffic Directorate: 595 staff members
- Administration and Finance Directorate: 631 staff members
- Transportation Directorate: 371 staff members.

The total staff of the organization amounts to 1 730 people.

The functions grouped underneath the Traffic Directorate consist of:

- Education and training
- Traffic engineering management (Traffic engineering projects, signalization, traffic engineering infrastructure management)
- Traffic operations (Traffic flow, parking, law enforcement, prosecution).

The functions grouped underneath the Administration and Finance Directorate include:

- Information management
- Asset management
- Financial management
- Administration
- Maintenance management, which includes the cleaning of facilities and security.

The functions grouped underneath the Transportation Directorate include:

- Management of public transport operations
- Registration and inspection of public transport vehicles
- Law enforcement and control of public transport operations.

### 3.7 Summary

To summarise, the Curitiba approach is based upon the notion that public transport must be promoted over private transport. Further, the quality of the system is such that it appeals to a very high percentage of residents of the city, therefore a high level of public transport usage is encountered in spite of relatively high car ownership.

## **4. BOGOTÁ**

### 4.1 Political Background

Bogotá is the capital city of Colombia and is situated in the Andes mountains 2 600m above sea level.

The Colombian government is democratically elected every four years. In recent decades Colombia has enjoyed virtually uninterrupted constitutional and institutional stability, with only limited influence from the military. The country is currently headed by President Alvaro Uribe, whose term stretches from 2002 to 2006 (Australian Government, 1).

Over the last quarter of a century Colombia experienced high economic growth and outperformed other main economies in Latin America with an average economic growth rate of 4,5% per year. In addition, Colombia was the only Latin American country not to default or restructure its foreign debt during the 1980s (Australian Government, 1).

Illicit trade in narcotics has a significant impact on Colombia. The country is the world's leading supplier of cocaine and is a major supplier of marijuana and heroin. The commercial worth of the illicit narcotics trade is difficult to gauge with any precision but is thought to be between 5 and 10% of GDP (Australian Government, 1).

### 4.2 Historic Development

Bogotá is a city with a total population exceeding 7 million people. 80 percent of the population relies on public transport for its mobility needs. It is estimated that 70 percent of air pollution in the city is generated by motor vehicles (Miranda).

Public transport in Bogotá consisted from 1884 to 1952 of an electric tram system. Buses started to emerge from 1923, and have been the only form of public transport since 1952. Just before the turn of the century (1990's) urban transport has deteriorated to the extent that it was characterised by (Miranda):

- Severe congestion
- Poor road network condition



- Long travel times (an average of 1,5 hrs per direction between home and workplace)
- High occurrence of accidents
- High levels of pollution.

This led to a situation where the focus in 1998 moved towards (Miranda):

- The re-construction and maintenance of sidewalks
- The construction of cycle paths
- Campaigning against the use of private cars
- The development of a formalised public transport system.

#### 4.3 Public Transport Strategy

In 1998 a political decision was taken to create a transport entity, Transmilenio, described as a transport entity for the third millennium. The goal with the creation of Transmilenio was to effect major change on the public transport front in order to improve urban mobility. This was to be done by means of bus rapid transport (BRT) system. The proposed system had two main goals: To improve the quality of life of citizens of Bogotá, and to improve the productivity of the city.

At that stage six basic principles were adopted (Miranda):

- Respect for life (improvement in road safety)
- Respect for the time of users of public transport (reduced travel time)
- Respect for human diversity (the system caters for all income groups, the disabled, etc)
- Quality (of vehicles, stations, access to stations, etc)
- Consistency (a regular and punctual service)
- Affordability.

Apart from these, the project had to be economically sustainable, and not create an unnecessary large burden on the tax payer.

#### 4.4 System Overview

Bogotá, to a large extent, followed the Curitiba example of dedicated bus roads, level loading and off-loading of passengers, and pre-selling of tickets, but with a number of improvements of the various technologies. The total Transmilenio project is anticipated to consist of seven phases. To date Phase 1 has been implemented, with the implementation of Phase 2 currently underway. Figure 7 schematically shows the layout of the city, and the alignment of the Phase 1 and 2 bus-ways (Miranda).

It should be noted that prior to the Transmilenio system, and still today in the large areas not covered by the Transmilenio system, public transport services consist of buses privately owned and operated. (In fact, only about 16 percent of public transport trips in Bogotá make use of the Transmilenio system (World Bank)). These buses are of all sizes, shapes, and age, but such a bus is typically a 20 to 25 seater between 10 and 30 years old. Each serves a certain route, but there is no formal planning of these routes, nor allocation of routes to specific operators. There are no time schedules, and buses stop to pick up passengers where-ever they want to, and drop them where-ever requested by the passenger. The fare is independent of the distance of travel, but only applies to that particular bus. Fares vary between 800 and 1 100 Pesos, approximately between R 2,20 and R 3,00 per trip. The fare for the Transmilenio bus system is 1 200 Pesos (R 3,40 per trip).

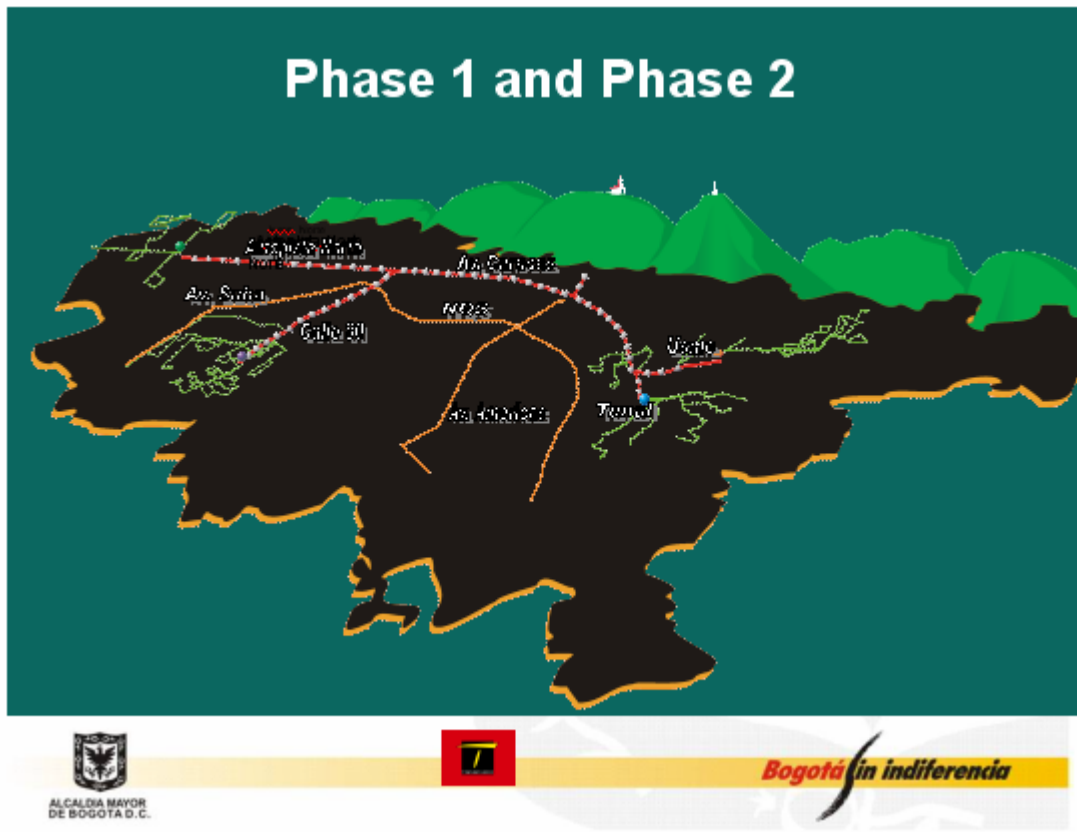


Figure 7. Phase 1 and 2 of the Transmilenio system in Bogota.

Figure 8 shows the schematic map of the Transmilenio system commonly being used by public transport users at present. The average distance between stations (equivalent to our busstops) is approximately 700m. Busses only stop at stations.

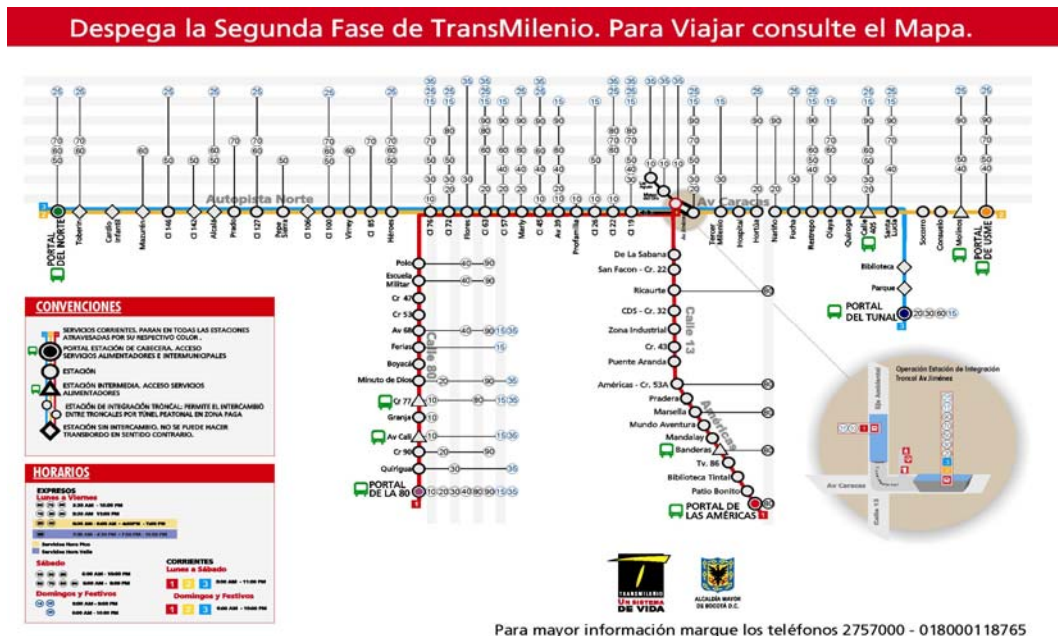


Figure 8. Schematic map of the Transmilenio system.

Figure 9 shows a picture of a bus route, consisting in this case of two two-lane carriageways with the bus stations situated between the roads. Access to the bus station is generally by means of a pedestrian bridge. The road pavement consists of high quality finish concrete placed on top of the existing road surface.



**Figure 9. Example of bus road and station.**

Other elements of the system include (Miranda):

- Terminal facilities where buses are parked, washed, maintained, and repaired when necessary.
- A vehicle control system in which data such as the GPS position of each bus and the number of passengers entering and leaving each station, are fed to a computer system in a control room. At the control room the operational conditions within the system are being monitored on a continuous basis, and when problem areas are observed, immediate action is taken. The control centre is in contact with each bus, both by means of a computerised link and a radio link. Action could, for example, consist of more buses being sent to an area where congestion is experienced.
- Fare collection by means of the selling of intelligent cards.
- Collection of money takes place at stations where tickets are sold, and money is transported to a bank in security vehicles. Funds are then distributed from a central bank account to the operators of the main bus system, the operators of the feeder system (maximum 20 percent of the total funds received), to Transmilenio (maximum of 11 percent of total funds received), and to the entity collecting the money from the stations and transporting it to the bank (maximum 0,5 percent of total funds received).

#### 4.5 Operating Companies

The operating companies have been awarded 10 year concessions, and these concessionaires had to meet the following criteria (Miranda):

- A high level of experience of public transport in Bogotá – the operators of existing buses, therefore, had to be involved
- Have strong international alliances
- Have access to extensive capital resources, i.e. to be able to buy the vehicles
- Be owners of a bus terminal (park)
- Have access to well-qualified drivers and mechanical maintenance and repair staff.

Remuneration of the bus operators is per kilometre driven, without taking into account passenger numbers, as with the Curitiba system (Miranda).

The Transmilenio company is responsible to plan for new routes, to estimate passenger volumes, and to determine anticipated income.

## 4.6 Statistics

Statistics of the part of the system already constructed are (Miranda):

- Number of stations: 78
- Number of kilometres of bus roads: 55km
- Number of main services buses (articulated): 607
- Average number of passengers transported per weekday: 885 000 (approximately 16 percent of public transport trips in Bogotá)
- Average operating speed: 27km/hr
- Number of feeder routes: 51
- Number of feeder buses: 342
- Construction cost of fixed infrastructure to date amounts to USD 210 million, or USD 5,0 million per km (R 1,26 billion or R 30 million per km)
- Vehicle costs are estimated at USD 3,0 million/km (R 18 million)

The buses being used on the mainline are articulated, each with a passenger capacity of 160 persons (48 seated, the rest standing). The bus (and bus system) is fully accessible to the disabled, and inside the bus seats are reserved for the aged, pregnant women and small children. In terms of emissions buses meet EURO II and EURO III standards. These buses have been fitted with automatic gearboxes (Miranda).

## 4.7 Operation of the System

How is the Transmilenio system implemented and operated? Infrastructure required is provided by the City of Bogotá with financial assistance from the national Department of Transport. Collection of fares is being done by a private concessionaire, and the operation of the bus service is being handled by a further number of private concessionaires. In Phase 1 of the project four operators were selected for the mainline service, with the number of buses per operator varying between 90 and 160 buses. For the collector service seven operators were selected, with the number of buses per operator varying between 8 and 51 (Miranda).

Benefits of the Transmilenio system to date include (Miranda):

- 2 000 of the old private buses could be scrapped
- Travel time was on average reduced by 32 percent
- Pollution levels have decreased by 40 percent
- The accident rate has been reduced by 90 percent
- 94 percent of the public transport operators active in the city before the commencement of the project have been incorporated into the concessionaire companies operating the new system.

## **5. COMPARISON TO THE SA SITUATION**

The question may well be asked whether the approach followed with the public transport systems just described is applicable to South Africa. Table 2 compares a few basic parameters of Curitiba and Bogotá with South African cities Tshwane, Johannesburg and Cape Town (Pryce Lewis):

**Table 2. Comparison of transport parameters.**

<b>Transport indicator</b>	<b>Curitiba</b>	<b>Bogotá</b>	<b>Tshwane</b>	<b>Cape Town</b>	<b>Johannesburg</b>
Population (million)	1,6	6,4	2,3	2,9	2,8
Peak public transport person trips (am 2hr peak)	428 000 (taken as 20% of daily figure)	870 000	510 000	400 000	487 700
Public transport vehicle fleet	2 100	21 000	17 500	10 770	13 450
Average public transport trips per inhabitant (am 2hr peak)	0,27	0,14	0,22	0,14	0,17

Note: 1995 data, except for Curitiba, which is current data  
Acknowledgement for all data, except Curitiba: Pryce Lewis

Based on the parameters assessed, it is concluded that the circumstances in these cities are comparable. The City of Cape Town is reported to be planning a BRT system on the Klipfontein Road corridor similar to the systems described in this paper, which supports the notion that the principles are also applicable under South African circumstances (ITDP).

## **6. PUBLIC TRANSPORT PERFORMANCE CRITERIA**

In order to assess the success of various types of public transport systems, the extent to which the systems meet certain pre-defined criteria can be evaluated. Most cities inherently differ more than is obvious (in terms of travel/social perceptions, availability and status value of owning a car, topography, etc).

Yet the criteria generally being used are normally similar, and refer to:

- The travel needs of passengers
- The motivation/evaluation of new systems or system elements
- The level of accessibility and mobility available to people in the city
- The compliance of services (by operators/contractors) rendered to specifications and user needs.

For bus contracts in South Africa performance levels have been measured quite scientifically and consistently over the years. However, a subjective observation is that since it became clear that subsidy levels are not reducing, the quality and extent of compliance monitoring has recently been somewhat neglected.

It is characteristic of South African public transport monitoring that very little area specific passenger needs and satisfaction research are being undertaken. If undertaken, it is either on a very broad basis or focussed on existing passengers. This ignores the very essence of business principles, which is the continuous investigation into opportunities and potential for expanding and optimising your product or service rendered.

The NLTT Act lists the following public transport benchmarks: safety, security, punctuality, frequency, reliability, quality, speed / travel time, affordability, meeting special needs of passengers, modal integration, and reduced environmental impact.

In Table 3 the extent to which the Curitiba – and Bogotá systems meet the NLTTA criteria are compared to the extent to which our local bus and combi-taxi industries meet them. It should be noted that it is a generalised and broad assessment only. It should further be

noted that with regard to taxis, reference is made to the situation before implementation of the recapitalisation programme.

**Table 3. Matrix to demonstrate meeting of NLTTA performance criteria.**

No	Description	Curitiba, Brazil	Bogotá, Colombia (Transmilenio)	SA buses	SA combi-taxis
1	Safety	Bus accident rates very low	Bus accident rates very low	Considered to be at an acceptable level	Combi-taxi accident rate unacceptable
2	Security	Very good – closed system with security guards	Very good – security guards at every station. All buses radio linked with control room	Generally perceived to be a problem, not necessarily on the vehicle itself, but at bus stops, etc	Generally perceived to be a problem, especially for potential higher income passengers
3	Punctuality	Not important due to high frequency	Excellent – duration until next bus arrives shown at stations	Varies, but in many cases poor, making bus transport unattractive to anyone experiencing time pressure	In peak periods the service is generally available, although considerable queuing may take place. In off-peak periods the absence of a time table makes the service unattractive to anyone experiencing time pressure
4	Frequency	Very high	Very high	Significant room for improvement if patronage can be improved	Acceptable at the rank end of the trip, fairly unpredictable at the collection (residential) end
5	Reliability	Very high. Buses relatively new, good vehicle maintenance	Very high – age of buses restricted Excellent maintenance and service. Permanent radio contact	Not at acceptable levels	Not at acceptable levels
6	Quality	Excellent	Excellent	Generally only those that have no other choice use bus transport	Poor, overloading of vehicles, difficult access to the door of the vehicle
7	Speed/travel time	Excellent – faster than private vehicles	Excellent: much faster than private vehicles	No competitive advantage	No competitive advantage, When speed is high it is normally associated with high accident risk
8	Affordability	Very affordable due to high utilisation (no subsidisation of the service itself)	Very affordable due to high utilisation (no subsidisation of the service itself)	Very affordable (subsidisation plays a key role in this regard)	Affordable, mainly made possible by overloading and poor vehicle quality



**Table 3. Matrix to demonstrate meeting of NLTTA performance criteria (continued).**

No	Description	Curitiba, Brazil	Bogotá, Colombia (Transmilenio)	SA buses	SA combi-taxis
9	Special passengers	Cater for the disabled	Cater for the disabled	No provision made for the disabled	No provision made for the disabled
10	Modal integration	Very good between various types of services, not additional cost to the user at change-overs	No integration between Transmilenio and the old bus system (still playing a vital role)	Various attempts to address – limited success. No integration of fare systems	Restricted to trips serving train stations
11	Environmental	Low impact due to usage of fewer, larger vehicles, meeting high emission standards	Low impact due to usage of fewer, larger vehicles, meeting high emission standards	Relatively little progress made to date	Relatively little progress made to date

From Table 3 follows that the South-American systems appear to do much better than what is currently being achieved in terms of meeting the benchmarks set by the NLTTA.

A remark at this point in time: As far as the integration of land use and public transport planning is concerned, Curitiba has been very successful in developing dense corridors along transportation corridors. Clearly this type of land use development supports public transport in that walking distances to the system are short (easy access) and passenger density is high, which contribute significantly to the financial viability of the system. It is sometimes argued that this approach was only possible due to the unitary political system in Brazil at the time. It is worth noting, however, that in Bogota the Transmilenio system has only been implemented since 1999 after a relatively short planning period, and under conditions of a full democracy. This system is successful in spite of the fact that corridor development as such is not being promoted.

## 7. CONCLUSIONS

From the above observations the following conclusions are drawn:

- Compared to what has been done in Curitiba and Bogotá, South Africa is still far away from the NLTTA direction that for the purposes of land transport planning and the provision of land transport infrastructure and facilities, public transport must be given higher priority than private transport.
- Strong political support and leadership is essential, as with any new system there will be resistance, increased capital investment, and teething problems.
- Implementation of an effective, modern public transport system will contribute significantly towards improving the image of a city, attracting new investments and improving the quality of life of citizens.
- For public transport to be effective, it must cater for all income groups. In South Africa there is a perception that train and bus transport is the mode catering for the poorest of the poor, that those that are better off, make use of combi-taxi's, and that the affluent use their own motor vehicles. Hopefully the Gautrain project will also help to change this perception.
- It is mainly when public transport offers a better service than that experienced by the private car user, that people will be attracted to public transport.

- Regulations may have an important role to play: In Bogota access by private vehicle to certain areas in the CBD are prohibited on certain days of the week (depending on the last number of the vehicle's number plate). This is strictly enforced.
- The public transport planning/management authority or unit should have enough staff to perform the necessary planning, management and control work. URBS has shown that by integrating planning, management and control functions into one organization, a considerable increase in co-operation and efficiency can be achieved.
- Effective supervision, control, and law enforcement is essential. There should be no tolerance towards non-roadworthy vehicles, transgression of traffic regulations, and not sticking to the agreed timetables. In Bogotá, for example, there is a range of requirements the operators must meet, and if not met, a pre-determined penalty is automatically applied.
- There are valuable lessons to be learnt from South America. This does not mean that we should implement the same systems as were implemented there, rather the principles applied should be considered for adoption here.

## **8. HOW CAN WE MATERIALLY IMPROVE PUBLIC TRANSPORT?**

The question, what can be done in South Africa to materially improve public transport as was done in South America, is not an easy one to answer. However, in order to stimulate debate in this regard the authors do offer a number of suggestions:

### 8.1 Clarity with Regard to Legislation

There is, in the opinion of the authors, poor compatibility between transport legislation and other national legislation which needs to be addressed.

Examples include:

- The NLTTA has now been in place for nearly five years, and the Urban Transport Act for nearly 40 years. Yet new and innovative financial support for public transport is still minimal, with the exception of committed aspects such as bus and rail subsidies, or ad-hoc non-ITP projects. Transport authorities, which are a first step to address public transport, are still struggling to obtain funding commensurate with the importance of moving towards improved public transport. This is apparently due to poor support from national government departments and poor communication between departments.
- Transport legislation and land development legislation have little practical interaction. Integrated Development Plans (IDP's) and Integrated Transport Plans (ITP's) often only pay lip service to each other. Virtually no technical testing to verify that IDP's will be practically and successfully supported by a fully funded and integrated transport system, are undertaken. The difference in the cost of mobility and accessibility can only be determined by comparing various modal costs to each other, over time. This requires technical expertise not readily available.
- At local level land use development structure plans are not available, or are inadequate to manage and develop cities in a balanced way. Cases of oversupply of similar land use rights in the same areas occur. Public transport facilities for new developments, such as shopping centers, are provided with big developments only, and then often at such a low level that it does not meet the needs of customers or employees.
- Relevant transport legislation (for example the NLTTA), supported by the Land Development Act, places the responsibility for developing and managing Integrated Transport Systems and Plans in urban areas (with some exceptions regarding rail systems and operations) squarely with the metropolitan transport authorities. Despite this, major transport projects, which drastically impact on urban developments in

metropolitan city areas, are undertaken by provincial and national government, or their agents, with scant regard to the city's ITP. Some of these projects, if integrated with the local ITP, can make dramatic improvements in the development of the said city's transport system, its Central Business Districts (CBD) Areas and in the promotion of public transport provision, status and usage.

## 8.2 Human Resource Availability

Some of the above examples illustrate a matter of great concern, namely the shortage of suitable structures and adequately qualified staff at local and higher levels of government. Staff that can use and apply specialized transport and land use technical and financial planning tools (demand determination and transport project benefit/cost determination) are in critical short supply, with relatively little being done to assist South Africans to qualify in these fields.

It is with great enthusiasm that note is taken of the national government's resolutions and actions in promoting subjects such as mathematics and other technically related subjects at school level. There is no doubt that government in general, and local authorities specifically, must support these initiatives to the fullest, so as to ensure that our increasingly complex modern cities and economies can be sustained.

## 8.3 Political Will and Commitment

Some unexpected observations were made during the research for this paper and previous study visits to approximately 40 cities throughout the world, namely that the specific structures adopted by cities to provide suitable passenger and freight services (differing from full city ownership to virtual full 'outsourcing') are not nearly as important as the basic principles being adhered to.

These invariably include the following:

- Identification of travel demand, and a commitment to provide adequately for it by the transport authority.
- The establishment of suitable structural, human and other infrastructure to provide in the identified needs is crucial. The current local specification that a transport authority may not be a public transport provider does not appear to be shared in most countries.
- The public transport planning/management authority or unit should have enough staff to perform the necessary planning, management and control work.
- A commitment that public transport within a municipality needs to be strictly controlled and that the supply, law enforcement and management thereof must be undertaken effectively and decisively, and at the local level of government. Liaison with the public transport industry and the public should be undertaken by, or through, the local authority structures.
- Acknowledgement that ultimately, public transport is the means for the majority of citizens to exercise their constitutional rights of access to work, health care, education and opportunities for social interaction.

## 8.4 Other Crucial Issues for Effective, Integrated Transport

Other crucial issues to be addressed for effective and integrated transportation system provision in South African cities include:

#### *8.4.1 The Return on Investment and Subsidy Requirement to be Determined Prior to Implementation of New Policies or Projects*

Public Transport is, to some extent, locality specific. For example, Hong Kong, a city squeezed in between the mountains and the sea, was able to fund, build, operate and pay off one of the biggest underground metro systems in the world within 9 years. At the same time Tsuen-Mun, a growing city to the south-east of Hong Kong with open topography, had difficulty in maintaining the subsidies required for a recently completed light rail streetcar system.

#### *8.4.2 Metropolitan Responsibility*

Real authority to manage the fully integrated multi-model transport system for a city must rest with the city, with guaranteed financial provision to ensure that this function can be fully executed. This must exclude any ad hoc transport interventions into the city's transport system from other sources. A wide range of mechanisms are available, or combinations thereof (from full outsourcing to in-house operations). The crucial aspect is that travel demand, customer support, management and quality control must be the responsibility of the local authority.

Local integration of related functions must take place effectively and on a continuous basis. Law enforcement and street/kerb traffic management must be a combined operation between the relevant departments. At the same time the units responsible for the ITP and the IDP must ensure that planning proposals are compatible and manageable by the traffic flow and enforcement departments.

Currently approved national projects, for example the upgrading of railway services, the Gautrain project, the taxi recapitalisation programme and the current ITP's and IDP's should be integrated, planned and executed as combined metropolitan transport projects at local level, with sufficient input by metropolitan transport authorities.

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