

**Sustainable Public Transport Systems:
Moving Towards a Value for Money and Network-Based Approach and
away from Un- and Mis-informed Blind Commitment**

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Abstract

Growing public transport patronage in the presence of a strong demand for car ownership and use remains a high agenda challenge for many developed and developing economies. While some countries are losing public transport modal share, other nations are gearing up for a loss, as the wealth profile makes the car a more affordable means of transport as well as conferring elements of status and imagery of “success”. Some countries however have begun successfully to reverse the decline in market share, primarily through infrastructure-based investment in bus systems, commonly referred to as bus rapid transit (BRT). BRT gives affordable public transport greater visibility and independence from other modes of transport, enabling it to deliver levels of service that compete sufficiently well with the car to attract and retain a market segmented clientele. BRT is growing in popularity throughout the world, notably in Asia, Europe and South America, in contrast to other forms of mass transit (such as light and heavy rail). This is in large measure due to its value for money, service capacity, affordability, relative flexibility, and network coverage. This paper takes stock of its performance and success as an attractive system supporting the ideals of sustainable transport.

Keywords: Bus Rapid Transit (BRT), Value for Money, Network Coverage, Systems

Introduction

“It’s a bright, sunny spring morning in Eugene, Oregon as you head off to work. Three blocks from your home is a Lane Transit District BRT stop. You check your wireless Handspring PDA to see when the next “train” is scheduled to stop. LTD’s wireless information system assures you that the next “train” is only three minutes away. You check your watch. It’s 7:24 am. At precisely 7:27 am, the inbound commuter “train” pulls into your stop. Extra wide doors open and a couple of people get out. You step aboard the low floored vehicle, point your Bluetooth-equipped PDA at a similarly-equipped ticket counter device. You electronically transfer the price of your ticket and take a seat. Swiftly, quietly, without a wisp of pollution, the rubber-tired, articulated bus heads for the next stop, unobstructed by other traffic because it operates on its own dedicated lane system. Exactly 18 minutes later, you arrive at your stop, just two blocks from your place of work. The ride has been smooth, quiet and trouble-free. You have even had time to check your email. This scenario may soon become a reality, at least the Bus Rapid Transit aspect, if not the wireless ticketing part. Lane Transit District is on track to become one of the first communities in America to introduce the next generation of BRT in the form of the Irisbus Civis electric bus.” (Bill Moore, *Eworld*, March 31, 2001)

There is growing support for an attractive alternative means of transportation to the car in cities. If increased public transport capacity is the way to proceed, it is very important that the investment in such systems is made in a rational way. There is a need for sensible selection and funding of technology and consideration of appropriate ways of addressing the problems attributed to the automobile. Although there are signs of a shift from light rail to bus-based systems¹, following on from the earlier shift from heavy rail to light rail (Mackett and Edwards, 1996a,b; Edwards and Mackett 1996), there are still many examples of more sophisticated technology being used than is necessary, especially given tight budgets and the risk of spreading thin resources even thinner².

Using the recent extensive media exposure in Sydney as an example of the focus of the debate in many developed economies, which suggests the need for greater investment in public transport, something to be commended, the challenge is to place this recognition in context. After many years of trying to instill some sense of relevance in the debate on public transport, it is easy to conclude that if money was no object and the public as a voting democracy (with all its warts and limited information) really wants government to grow significant amounts of public debt, then let’s invest in heavy and light rail³ – all

¹ Given recent evidence that bus rapid transit is less riskier in terms of cost overruns and patronage forecasts than rail.

² We understand the deals that are done by manufacturers on huge discounts of capital costs; however this does not solve the problem of ongoing high maintenance and operating costs. At a recent UITP conference the President was criticised off-line by rail companies for promoting the virtues of bus rapid transit.

³ A previous Director-General of Transport in Sydney (John Lee) has stated that if there is one issue in public transport policy that ranks as a cargo cult, it is light rail. “After six or so years of operating public transport, I believe the existing combination of heavy rail and buses is the right mix for Sydney. There is no substitute for heavy rail for mass transit over a distance. For sheer people-moving power around a spread-out city such as Sydney, it cannot be beaten. However, heavy rail cannot take us everywhere we want to go. There will always be a need for linking services in confined areas such as the Sydney central business district. And any rail-based system is expensive to build and maintain because it involves both rolling stock and line infrastructure. The benefit of buses is they cost very little to run and are flexible to operate. Neither is true of light rail, which is comparatively expensive to run and delivers a corridor, not a network,

would be happy so we are informed?. Unfortunately there are at least two major deficiencies of this popular perception of a ‘solution’⁴ to meeting Sydney’s transport needs – namely the huge cost involved (in the billions, not millions) and the inability of such a solution to deliver more than a service to specific corridors, to the neglect of the systemwide network needs (Kain 1988). There are many possible ways of investing in improved public transport, assuming that it will substantially resolve the claims about Sydney’s traffic congestion. These include heavy rail, light rail, and bus rapid transit (BRT - where buses have their own dedicated roads just like trains have their own dedicate track – and please note we are NOT talking about buses competing with cars in mixed traffic).

Globally there is growing support for delivering service capacity through bus rapid transit as a legitimate alternative to heavy and light rail within the traffic density range that Sydney experiences. Typically, \$1billion buys 400 kilometres of dedicated BRT in contrast to 15 kilometres of elevated rail or 7 kilometres of underground rail (Wright 2005)⁵. Most importantly, this not only delivers greater network coverage (pretty obvious really) but also falsifies the traditional view of the capacity of specific public modes (buses up to 6,000 passengers per hour in one direction compared to up to 15,000 for light rail/tram and over 15,000 for heavy rail/metro). Advanced BRT systems such as TransMilenio in Bogota (Columbia) can move 38,000 passengers per hour in each direction⁶.

There are a growing number of examples around the world, and the International Union of Public Transport Operators (UITP) in Europe has recently stated that BRT is increasingly preferred over fixed rail systems for value for money. Despite the evidence and argument, there will be readers who will immediately ignore what I have said and simply keep pushing very expensive fixed corridor rail systems and which will fail to serve the fuller demands of the Sydney metropolitan area. Our challenge is to get away from thinking of BRT as those awful polluting buses that get delayed because they compete with cars and occasionally are offered bits of disconnected roads (in the name of bus lanes, T2, T3). This is not BRT. Today we can start the investment (as many cities

of flexible services. If a road is closed, a bus can take another route. If patronage changes, the route can be altered. Light rail can't respond in this way.” (Opinion Piece, Sydney Morning Herald, 17 January 2006)

⁴ The Sydney debate focuses on a view that buses cause congestion and Light rail in the CBD will eliminate traffic gridlock!. Buses cause congestion is fallacious; buses account for less than one per cent of traffic in the central business district of Sydney, according to Department of Planning data, so it is not buses causing congestion. Reducing congestion has to be directed at other vehicles, especially cars, which make up 67 per cent of traffic. Light rail's track system and overhead cables make a much greater mess of city streets and take up more room.

⁵ Even if these numbers are debatable and subject to error, the differences are sufficiently stark to be worthy of note.

⁶ The important point should not be the capacity of vehicles but the capacity of the service. At present, buses deliver 5,100 people an hour inbound on George Street at Railway Square in Sydney in the morning peak. The buses have the capacity to carry about 7,500 an hour at 60 people a bus. Light rail's capacity is 3600 an hour at working capacity, with people sitting and standing comfortably, and 4,800 an hour at crush capacity. Clearly, the arguments about capacity don't wash. In addition, buses can seat 75 per cent of passengers compared with 25 per cent on light rail, so most passengers would have to stand. With fewer trams carrying more people, there would be longer waiting times.

have such as Curitiba, Brisbane, Taipei, Bogota, Pittsburgh) in BRT with clean fuelled 'buses'⁷ and get away from the adage that 'trains are sexy and buses are boring' (Richmond 1998, Hensher 1999).

There is a need to set aside dedicated 'roads' for BRT to achieve its potential, noting that the width of a right of way required for BRT is far less than for railways⁸, not only in the inner city-CBD area but across a metropolitan network? Crucially, the technology must not be the determining influence; rather the way forward is to identify systems (i.e., integrated vehicles and infrastructure) that will provide a high level of service capacity throughout a connected network, delivering frequency, connectivity and visibility (that is – we know where the services go to and from). All of this support for public transport must be part of a larger package in which we consider ways of financing improved public transport, and a good start is to learn from the experiences of London and Stockholm where a congestion charging scheme is in place. The money raised in London and Stockholm is earmarked for investment into public transport – surely a sensible strategy. Politically it has worked, which is very important. Over 30(25) percent of previous car users in the City of London (Central Stockholm) now use public transport, and continuing car users see benefits in improved travel times; and most importantly the politicians have earned respect for taking such an initiative. All of this seems so obvious in many ways; yet will Sydney and other world cities rise to the occasion?

What about the future for bus systems?⁹ Buses, especially bus-based transitway systems are arguably better value for money, and if designed properly, can have the essential characteristic of permanence and visibility claimed to be important to attract property development along the route, which is compatible with medium to high density corridor mobility¹⁰. We argue, through an assessment of BRT systems throughout the world, that their cost structures impose less burden on taxpayers in subsidies per passenger, so you can build MUCH MORE of it than competing transit systems (such as LRT), for any given amount of investment in transit, and consequently, the environmental, energy, and traffic reduction benefits of BRT are likely to be much higher than LRT. BRT can also provide higher quality service by avoiding time-consuming transfers, with more direct origin to destination service, and modern technology permits designing BRT systems that can be very, very attractive, both the vehicles, stations, and rights of way. Importantly,

⁷ Diesel technology has come a long way in reducing emissions, with the new Euro 3 buses emitting less than natural gas buses. Light rail is cleaner for the environment. Heavy and Light rail is not powered by magic. Electricity has to be generated, typically by coal-fired power stations, which are among the worst greenhouse polluters.

⁸ In addition, there is no overhead wiring and gantry's and signal systems.

⁹ Furthermore, despite the growing appeal of bus-based transitways, there is still a lot that can be achieved by simple solutions such as adding more buses, adjusting fare schedules, improving information systems, and integrating ticketing which is lost in the debate on over whether special rights-of-way for buses as against light rail are better.

¹⁰ Newman and Kenworthy (1989, 28) puts forth the view that good rail transit systems provide the opportunity for highlighting public values in ways which give a city new pride and hope for the future. While this may have some truth, it should not deny the capability of achieving the same impact with a high quality dedicated bus-based transitway. The images created in promotion of the Liverpool-Parramatta transitway in Sydney and the Brisbane Busway system actually are more appealing to civic pride than the existing heavy and light rail systems. Yet rail buffs still do not like it.

BRT can be built MUCH faster than competing systems and is more adaptable to changing travel patterns¹¹.

The Appeal of BRT

BRT has shown to be an effective catalyst to help transform cities into more liveable and human-friendly environments. The appeal of BRT is the ability to deliver a high-quality mass transit system within the budgets of most municipalities, even in low-income cities. BRT has thus proven that the barriers to effective transit is not cost or high technology. The principal ingredient is simply the political will to make it happen. (Wright and Hook 2006, preface)

There is growing evidence around the world, in origin-destination density contexts similar to the locations proposed for light rail, that a dedicated BRT system (i.e. road infrastructure dedicated to buses only as in Brisbane, Curitiba, Bogota, Pittsburgh, Ottawa etc.) can carry the same number of people as light rail for a typical cost 4 to 20 times less than a light rail transit (LRT) system and 10 to 100 times less than a heavy rail system¹². It is flexible, it is as permanent as light rail and it can have the image of light rail (rather than image of boring buses) if planned properly.

The 16 kilometre state-of-the-art South East Busway in Brisbane (opened in 2000) is an example of a busway system that has exceeded expectations in patronage. In the first six months of operation, the number of passengers grew by 40% or by more than 450,000 new passenger trips, giving a daily average of 58,000. Over the first 3.5 years there has been an 88% increase in patronage. It is reported (in The Urban Transport Monitor February 8, 2002) that 375,000 private vehicle trips have been converted to public transport. Pittsburgh's (8 kilometre) third busway, which opened in September 2000, secured average weekday patronage growth of 23% over the first 17 months. Current Pittsburgh average daily passenger trips on the full busway system of 43.8 kilometres) is 48,000 and growing steadily.

On a number of reasonable assumptions, the patronage potential for a bus-based transitway can be as high as twice that of LRT¹³. The relativities will be determined by

¹¹ In some countries, BRT avoids the stranglehold that rail unions often have on the system, usually leading to inflated costs.

¹² The USA General Accounting Office (2001) audit of BRT and light rail in 6 US cities. What they found was that the capital cost per mile for LRT compared to BRT in its own lane was 260% more costly. Comparisons with BRT on street or on an HOV lane are not useful and have been excluded. When one notes the lower operating costs of BRT as well, for both institutional and maintenance reasons, the case is clear.

¹³ Results of Port Authority's Busways, David Wohlwill, <http://131.247.19.10/media/presents/trb-04/wohlwill.pdf> suggest that the Average Operating and Maintenance Costs Per Rider (FY 1995 Data) are: South Busway = \$1.03; East Busway = \$0.95; Remainder of Bus System=\$2.55; Light Rail System =\$3.22. Operating costs for Pittsburgh's East and South Busways (1989) averaged \$0.52 per passenger trip whilst cost per passenger trip for light rail lines in Buffalo, Pittsburgh, Sacramento and San Diego averaged \$1.31; See http://trb.org/publications/tcrp/tcrp_rpt_90v2.pdf. Sislak, K.G. (2000) undertook a comparison between light rail and BRT options in Cleveland and Nashville: Cleveland - operating and maintenance costs are around one sixteenth that for the light rail option and capital costs are just over a quarter of that estimated for the light rail option; Nashville- capital cost for BRT under half of that estimated for light rail option (at

the sophistication of the design of the bus-based transitway system. Establishing actual patronage is another issue, although we have yet to find any unambiguous evidence to suggest that you can attract more people to LRT than a bus-based scheme. This arises because of *the difficulty of finding very similar circumstances in which both LRT and a geographically comparable bus-based system are in place*. Certainly the performance of the dedicated bus-based transitway systems in Curitiba, Bogota (Estache and Gomez-Lobo (2005)), Brisbane, Pittsburgh and Ottawa deserve closer scrutiny.

Menckhoff (2005) has reviewed the specifications and performance of 10 existing BRT systems (totalling 320 kms.) and 11 systems (adding another 240 kms.) that will be in place within two years in Latin America as part of a World Bank assessment. Describing Latin America as a ‘fascinating urban transport laboratory’, Menckhoff documents the distinctive image and high productivity of public transport systems that has arisen out of the South American initiatives. Key to the success is institutional reform and the specification of a BRT system that delivers feeder-truck operations, bus overtaking at stops, four lane (2+2) busways for high-demand corridors, limited stop and express services, high-capacity trunk-line articulated (18 metre, 160 passenger) and bi-articulated (25 metre, 260 passenger) vehicles, high level ‘heavy rail-like’ entry into buses often through centrally located bus stations, and prepayment of fares. A novel reverse of practice elsewhere is the decision to elevate the bus stop/station platform so that buses can be built on a truck chassis which is much less costly than low-floor buses. In addition, two-directional bus stations in the median were first introduced in Bogota’s TransMilenio, which required left-hand doors for all trunk-line buses. This has the advantage of savings in physical space and station labour.

BRT in Latin America has shown to be capable of moving passengers at a fraction of the cost of other high capacity modes; and most importantly has helped to reshape the less than desirable image of road-based public transport. The political windfall has been substantial to the Mayors responsible for their implementation. A limited comparison of selected BRT, light rail, elevated rail and subway systems (Table 1) shows the appeal of BRT in terms of passenger flows and costs. At relatively high commercial speeds (15 to 32 kph), Curitiba is carrying peak volumes in excess of 14,000 passengers per hour per direction, increasing to over 20,000 passengers per hour per direction where extra passing lanes are provided at bus stops. In Bogota the Transmilenio double-width busway accommodates 35,000 passengers per hour per direction with a mixture of all-stop and express bus services.

Table 1 Comparative Indicators of Performance

System Type	City	Corridor length	Cost per km (\$US million)	Actual Capacity (Passengers per hour per direction)
Latin America				
BRT	Curitiba (1994 extension)	57	1.5	15,100

grade). Operating and maintenance costs for LRT estimated to be \$4.6 million annually (\$18.28 per LRT car mile). BRT operating and maintenance costs estimated to be \$3.2 million annually (\$12.73 per bus mile).

Heavy Rail	Sao Paulo	114	3.0	60,000
BRT	Bogota	40	5.3	42,000
Other Locations				
LRT	Lyon	18	18.9	**
LRT	Bordeaux	23	20.5	**
LRT	Los Angeles (Gold)	23	37.8	**
LRT	Zurich (2005 ext)	20	42.0	**
Elevated rail	Bangkok	23	73.9	42,000
Heavy Rail	London (Jubilee)	16	350.0	25,000
BRT	Taipei	57	0.5	**

Sources: Wright (2005), Menckhoff (2005). ** = not available

The success of BRT in Latin America should not be seen as a regional-centric peculiarity but rather a reflection of the particular period in time in which opportunities to work with specific technologies has occurred. Light rail is more common in Europe, in large part due to the availability and promotion of this technology by European manufacturers in earlier periods; which explains much of the inertia in not moving to alternative technologies and system. Indeed when recently questioned by a French researcher on this very point about the popularity of light rail in comparison to BRT in France, the point missing in the argument is that not only is the light rail technology French, it also came with generous financial incentives in the context of limited French investment in new BRT systems. This is now changing as the global opportunities to develop BRT systems are growing, in part attributable to the demonstrated benefits flowing from the South American success.

A review in Canada undertaken in 2004 by the Canadian Urban Transit Association identified a number of major benefits of BRT, which have repeatedly been reported in many other jurisdictions:

- *Service speed and reliability.* With average operating speeds of 45 to 50 km/h and consistent travel times, BRT services on busways and bus lanes are more attractive than conventional transit routes operating at half that speed and with lesser reliability due to congestion.
- *Greater patronage.* BRT projects build patronage because they offer a premium service with faster speeds and greater reliability. The use of special branding to promote BRT services also helps attract new users.
- *Lower costs.* The faster average speeds of BRT reduce operating costs. And BRT facilities cost less to build than light rail because they do not need specialized electrical, track, vehicle maintenance or storage infrastructure.
- *High capacity.* High-capacity vehicles, frequent service and flexible routing structures allow BRT to match or exceed the passenger volumes of the busiest light rail systems.
- *Operational flexibility.* BRT allows a variety of customer services, with a single running way able to support express, local and skip-stop services—a difficult and expensive proposition in a rail environment.
- *Incremental implementation.* BRT systems can be implemented in stages. Buses can use a BRT facility to travel through a congested area, then switch onto a roadway to serve a relatively uncongested corridor.

- *Land use change.* BRT can stimulate the development or redevelopment of compact, pedestrian- and transit-friendly land uses, when supported by complementary land use and zoning policies. This contradicts the claims by proponents of light rail that only rail-based investments can deliver such development stimulus because it is ‘permanent’.

A review of US BRT experience (Federal Transit Administration 2004) indicated significant increases in transit patronage in virtually all corridors where BRT has been implemented. Though much of the patronage increases have come from passengers formerly using parallel service in other corridors, passenger surveys have revealed that many trips are new to transit, either by individuals who used to drive or be driven, or individuals who used to walk, or by individuals who take advantage of BRT’s improved level of service to make trips that were not made previously. Aggregate analyses of patronage survey results suggest that the patronage increases due to BRT implementation exceed those that would be expected as the result of simple level of service improvements. This implies that the identity and passenger information advantages of BRT are attractive to potential BRT customers. Patronage gains of between 5 and 25 percent are common. Significantly greater gains, such as 85 percent in Boston’s Silver Line represent the potential for BRT.

Conclusions

This short paper is designed to reinforce the appeal of BRT systems over other public transport investment strategies. The growing evidence globally about the broad-based advantages of BRT over other systems such as light rail, and even heavy rail in some density contexts, is so strong on the main measures of performance that, at the very least, all governments should seriously evaluate the appeal of BRT. We acknowledge the big challenge in even referring to buses, given the emotional overtones and imagery that has not served the bus well in the past. But the incessant contrasts between buses in mixed traffic and light rail (which often mixes with other traffic), has failed to capture the real meaning of a BRT *system* in which the buses move along dedicated infrastructure. The challenge is to continue, through evidence, to reinforce this position and hopefully to move away from un- and mis-informed blind commitment to sensible outcome-based decision making.

Appendix

Source: Wright and Hook (2006)

Full BRT

Continent	Country	Cities with "full" BRT systems
Latin America	Brazil	Curitiba
	Colombia	Bogotá (TransMilenio)

Cities with BRT systems, as of January 2006

Continent	Country	Cities with BRT systems
Asia	China	Beijing
	Indonesia	Jakarta (TransJakarta)
	Japan	Nagoya (Yurikamome Line)
	South Korea	Seoul
	Taiwan	Taipei
Europe	France	Caen (Twisto), Clermont Ferrand (Léo 2000), Lyon, Nancy (TVR line 1), Nantes (Line 4), Nice (Busway), Paris (RN305 busway, Mobilien, and Val de Marne busway), Rouen (TEOR), Toulouse (RN88)
	Netherlands	Amsterdam (Zuidtangent), Eindhoven
	UK	Bradford (Quality Bus), Crawley (Fastway), Edinburgh (Fastlink), Leeds (Superbus and Elite)
	Germany	Essen (O-Bahn)
Latin America and Caribbean	Brazil	Curitiba, Goiânia (METROBUS), Porto Alegre (EPTC), São Paulo (Interligado)
	Chile	Santiago (Transantiago)
	Colombia	Bogotá (TransMilenio)
	Ecuador	Quito (Trolé, Ecovia, Central Norte)
North America	Mexico	León (Optibus SIT), Mexico City (Metrobús)
	Canada	Ottawa (Transitway)
Oceania	United States	Boston (Silver Line Waterfront), Los Angeles (Orange Line), Miami (South Miami-Dade Busway), Pittsburgh (Busway)
	Australia	Adelaide (O-Bahn), Brisbane (Busway), Sydney (T-Ways)

Existing BRT systems undergoing expansions, as of January 2006

Continent	Country	Cities with BRT systems
Asia	China	Beijing
	Indonesia	Jakarta (TransJakarta)
	South Korea	Seoul
Europe	France	Paris (Mobilien)
Latin America and Caribbean	Brazil	Curitiba, Porto Alegre (EPTC), São Paulo (Interligado)
	Chile	Santiago (Transantiago)
	Colombia	Bogotá (TransMilenio)
	Ecuador	Quito (Trolé, Ecovia, Central Norte)
North America	Mexico	León (Optibus SIT), Mexico City (Metrobús)
	United States	Boston (Silver Line)

Cities with basic busways, as of January 2006

Continent	Country	Cities with basic busways
Africa	Ivory Coast	Abidjan (Boulevard de la Republique)
	Réunion (France)	Saint-Denis
Asia	China	Kunming, Shejiazhuang, Shenyang
	Japan	Nagoya ("Key" Routes)
	Turkey	Ankara (Besevler-dikimevi), Istanbul (Taksim-Zincirlikuyu)
Europe	Belgium	Liege
		Evry
	Italy	Genoa
	Netherlands	Utrecht
	Spain	Madrid (Paseo de la Castellana)
	UK	Ipswich (Superoute 66), Runcorn
Latin America and Caribbean	Brazil	Belo Horizonte (Avenida Cristiano Machado), Campinas (Amoreiras), Manaus, Recife (Avenidas Caxangá, Joaquim Nabuco, Sul, and Herculano Bandeira), Rio de Janeiro (Avenida Brasil)
	Chile	Santiago (Avenida Grecia)
	Peru	Lima (Paseo de la República or "Via Expresa", Avenida Abancay, and Avenida Brasil)
	Trinidad and Tobago	Port of Spain
North America	United States	Los Angeles (San Bernardino Freeway, Harbor Freeway), New York City (Lincoln Tunnel), Philadelphia (Ardmore busway), Providence (East Side bus tunnel)
Oceania	Australia	Perth (Kwinana Freeway)

Cities with Enhanced Bus Services ("BRT-Lite"), as of January 2006

Continent	Country	Cities with enhanced bus services
Asia	China	Hong Kong
Europe	UK	London
Latin American and Caribbean	Puerto Rico (US Commonwealth)	San Juan (Rio Hondo Connector)
North America	United States	Alameda and Contra Counties (AC Transit Rapid Bus), Albuquerque (Rapid Ride), Boston (Silver Line Washington Street), Chicago (NEBR), Denver (16 th Street Mall), Honolulu (City / County Express), Kansas City (MAX), Las Vegas (MAX), Los Angeles (Metro Rapid Wilshire Boulevard), Orlando (Lynx Lymmo), Phoenix (RAPID), Santa Clara (VTA)
	Canada	Vancouver (B-Line), Montreal (STM R-Bus 505), York (Viva)

Cities with BRT systems under construction, as of January 2006

Continent	Country	Cities with systems under construction
Asia	China	Hangzhou
	India	Delhi
Europe	France	Evry-Sénart, Douai, Clermont-Ferrand (Line 1 Lohr system)
	Italy	Bologna

Latin America and Caribbean	Colombia	Bucaramanga, Cali, Cartagena, Medellín, Pereira
	Ecuador	Guayaquil (Metrovía)
	Venezuela	Mérida (Trolmérida)
North America	United States	Cleveland, Eugene
Oceania	Australia	Canberra
	New Zealand	Auckland (Northern Busway)

Cities with BRT systems in the planning process, as of January 2006

Continent	Country	Cities with systems in the planning process
Africa	All Africa	Accra (Ghana), Dakar (Senegal), Dar es Salaam (Tanzania), Lagos (Nigeria)
Asia	China	Chengdu, Chongqing, Jinan, Shenzhen
	India	Ahmedabad, Bangalore, Mumbai
	Taiwan	Chiayi, Kaohsiung, Taoyuan, Taichung, Tainan
	Other Asia	Bangkok (Thailand), Haifa (Israel), Hanoi (Vietnam), Jerusalem (Israel)
Europe	France	Cannes, Montbéliard, Besançon, Lorient, Amiens, Metz, Nancy (Line 2), Caen (Line 2), Valenciennes/Pays de Condé, Nimes, Le Havre
	UK	Cambridge, Coventry, Kent Thames-side, Leigh
Latin America and Caribbean	Colombia	Barranquilla, Soacha (Bogotá)
	Mexico	Aguas Calientes, Monterrey, Querétaro, Torreón
	Other Latin America and Caribbean	Barquisimeto (Venezuela), Guatemala City (Guatemala), Lima (Peru), Managua (Nicaragua), Fort-de-France (Martinique, France), Posadas (Argentina), Rio de Janeiro (Brazil), San José (Costa Rica)
North America	Canada	Brampton, Calgary, Durham region, Edmonton, Halifax, Mississauga, Winnipeg
	United States	Albany, Atlanta, Baton Rouge, Charlotte, Chicago (PACE), Denver, Detroit, El Paso, Hartford, Houston, Louisville, Milwaukee, Minneapolis and St. Paul, Montgomery County, New York City, Reno, Sacramento, Salt Lake City, San Diego, San Francisco, San Jose, Tampa Bay

Cities with systems at the exploratory stage, as of January 2006

Continent	Country	Cities with systems at the pre-planning stage
Asia	China	Fuzhou, Guangzhou, Nanjing, Tienjing, Wuhan, Xian
	Other Asia	Baguio (Philippines), Cebu (Philippines), Chittagong (Bangladesh), Ho Chi Minh City (Vietnam), Karachi (Pakistan), Manila (Philippines), Pune (India), Vientiane (Laos)
Europe	UK	Luton
Latin America and Caribbean	All Latin America	Guadalajara (Mexico), La Paz (Bolivia), Panama City (Panama), Santo Domingo (Dominican Republic), San Salvador (El Salvador), Tegucigalpa (Honduras)

BRT process stalled or cancelled, as of January 2006

Continent	Country	City
Africa	South Africa	Cape Town

Asia	Bangladesh	Dhaka
	China	Shanghai
	India	Hyderabad
Latin America and Caribbean	Mexico	Ciudad Juarez, Puebla
North America	United States	Virginia Beach

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