

Guidelines for Attractive Public Transport with a Focus on BRT



"Advanced BRT systems have provided many developing country cities public transport with rail-like capacities and speed. BRT Guidelines adapted to Swedish reality will be a valuable tool for the development of BRT systems and will contribute to reach the vision of doubling the market share of public transport"

Enrique Penalosa
President ITDP
Former Mayor, Bogotá, Colombia

ATTRACTIVE PUBLIC TRANSPORT WITH A FOCUS ON BRT

Attractive public transport is transport that is easy to understand and use. It offers fast, efficient travel. It has high frequency, is reliable and offers good quality and service. Availability, safety and high environmental standards are a prerequisite. The characteristics are distinctive for forward-looking attractive bus routes with high numbers of travellers. They constitute a clear structure in the city's public transport system.

Good system properties such as clear identity, short alignment, separate lanes and priority at junctions are necessary. The bus stops must have good protection against the elements and platforms with level-free entry. The vehicles must be quiet and run smoothly. A smooth upgrade to tramways should be possible.

BRT can be relevant in many contexts, adapted to local conditions.

- The core network in the city's public transport system that is complemented by feeder services and local busroutes, for example, in smaller and medium-sized towns and cities
- The complement of an overall system of interconnected hubs and target points in the large cities with developed fixed-rail solutions (metro)
- Central part of the network to ensure an attractive and reliable public transport where other parts can be given priority in mixed traffic

SYSTEM CHARACTERISTICS FOR BRT

- Easy to understand and use
- High visibility in the urban environment, own identity, design and branding
- Stops and stations, connecting public transport and the urban environment with high quality, in interaction with the citylife
- High frequency, long period of operations during the day
- Uninterrupted travel between the stops, full right-of-way priority at intersections
- Short line distances with smooth alignment, smooth road surface with high quality



These Guidelines use the generic term BRT, Bus Rapid Transit, for advanced public transport solutions with high-quality high capacity and encompass transport systems, vehicles and an infrastructure which interact with one another in order to create maximum traveller advantage and efficiency. Most of the contents in these Guidelines are applicable for both bus and light rail solutions. They should be dealt with equally from urban development perspective. BRT may not become a way to accomplish a low price solution. Properly designed, BRT can provide public transport solutions with high attractiveness and standards.

BRT STANDARDS IN SWEDEN – A STANDARD IN TWO LEVELS

Green level – required for high standard BRT.
Provides a high level of attractiveness and efficiency.

Yellow level – a good level with a high quality level.
Can partially be accepted for a BRT solution. The Yellow level is also relevant for the improvement of urban public transport in general.

FACTOR	GREEN LEVEL	YELLOW LEVEL
The city's design		
Urban planning	Joint planning between BRT and city development with anchored strategy, complementary activities, service and buildings around stops and hubs.	Only some new buildings and densifying near BRT stops.
Urban environment	Remodelling/renovation and quality improvement of street space, lighting, walking surfaces, vegetation, benches and other street furniture.	Only some car traffic reduction, prioritisation of walking and cycling.
Interaction of bus stops with built-up areas	The bus stops are an integral part of the urban environment, with close proximity to other functions in the city. Bicycle parking and connections with high quality are always to be found.	Stops in the vicinity of target points/the city's built-up areas but not fully integrated. Good and comfortable walkways to bus stops.
The placement of the lines	Direct, soft, through/central in residential and urban areas, no sharp curves. Less than 10 percent longer distance than the straight line distance between major stops.	Shortcuts, through/under roundabouts, few sharp curves. Less than 20 percent longer distance than the straight line distance between major stops.
Public transport infrastructure		
Preferential right-of-way and signal prioritisation	Full signal priority with stops only at bus stops and with active traffic control for high regularity. No bicycles in the transit lane, no interfering vehicles or curb parking and exits.	Signalling prioritised along the entire line. Usually no need for stops or traffic jams causing delays. Disruptive curb-side parking, exits and bicycles in the carriageway only to a limited extent.
Design of bus stops	Straight drive-in approach, level entrances, marked door positions/handicap entrance. Waiting area under roof of the entire of the bus, sitting benches, bus stop information, bicycle parking, walking and bicycle passage-ways outside the waiting area.	Straight drive-in approach, waiting area with shelters, sitting benches and bus stop information.
Identity	Unique identity, attractive design and trademark on the vehicle, bus stops and info.	Unique marking/design of vehicles and bus stops.
Design of carriage-way/separation	Dedicated lanes or separate busways that are solely for buses. "Inside the system thinking".	Separate lanes or guaranteed accessibility without delays, partly separate busways, quiet stops without interfering fast car traffic.
Marking of the busway	Separated from car traffic with physical demarcation and different colours on driving lanes.	Lane marking with wide, solid white line and the text "BUS".
Surface covering and design	Smooth driving surface, no "manholes." Sloping curves at separate bus roads.	No speed bumps/humps for the bus. Prioritised winter road management.
Stopping distance in built-up areas	500–800 metres	400-500 metres or more than 800 metres
Vehicles and support systems		
Vehicles	Adapted vehicles, wide doors, own design, extra soft running and very quiet, especially at stops. Level entrances, marked handicap entrance, if necessary automatic wheelchair ramp/"gap filler."	Low-floor buses with wide doors. Entrance in all the doors. Quiet, especially at stops.
Information on stops	Traffic info, neighbourhood map with target points. Activatable speakers, departure time display, active information in the event of a traffic disruption.	Clear line number and destinations, route map, real-time information for the line.
Information in vehicles	Real-time information, information on connections at upcoming stops and active information in the event of disturbances.	Route map and information/calling out stop, also next stop.
Traffic		
Reliability / regularity	System which ensures regular intervals between vehicles and without delay for the passenger.	Delay half the frequency maximum one occasion per hour
Bus stop times and ticketing handling	Ticket/payment solution which does not affect the duration of the time at the bus stop. The possibility to buy a ticket at the bus stop. Less than 1 second/boarding and door.	Exiting and entering in in all doors, no pre-notification. 1-1.5 seconds/boarding and door.
Frequency, daytime	Less than 8 minutes.	Approximately 10 minutes.
Frequency, off-peak	Less than 15 minutes.	Less than 20 minutes.
Hours of operation	At a minimum, 5:00 a.m. – 12 midnight.	At a minimum, 6:00 a.m. - 11:00 p.m.

For a good BRT solution, it is the Green level that must be achieved. The Yellow level should only be adopted when a green level is not practical or economically feasible.

GOOD URBAN PLANNING IS CRUCIAL

The objectives of a BRT line must not be overlooked. High quality must be prioritised for quick and convenient public transport. It can also strengthen the conditions for increased integration of public transport in the city and provide the basis for a sustainable urban development.

The design of the city provides the conditions for the attractiveness and efficiency of public transport, and thus also the need for economic support.

A city adjusted for public transport, where BRT is a natural part, is a dense and mixed city where a bus stop is located closer than a parking lot.

Integrated with buildings and built-up areas

Planning for public transport routes near residences with service, business and high residential density close to the bus stops. Ensure interaction with other modes of transport, especially walking and bicycling. One challenge is to create an attractive multi-modal urban network in an urban region.

BRT has characteristics like a railway solution and can offer a high level of attractiveness and capacity. BRT is not the goal in and of itself, but rather a tool to be used in order to achieve attractive and efficient public transport. The goal is a living city where it is easy for everyone to get around.



Part of the urban environment

Integration of the infrastructure of public transport with the city's built-up area is necessary. It is about planning in detail, establishing and promoting urban functions (commerce, education, events, etc.) at a BRT line's bus stops, preferably within view from the stop. Creating urban life in public places around bus stops and stations is an important part of this.

Part of the public transport system

The overall entirety is crucial. All the parts in the system must contribute. The routes and network provide the preconditions for the travellers. The transport offered provides the preconditions for the competitiveness of public transport. Quality and customer experience determine how satisfied one is as a traveller.

A successful public transport system also requires good cooperation with other transport networks. The BRT solution must be an integral part of the city's transportation system and be able to develop and grow in line with increased demand for passenger capacity.



THE BUSWAY

Public transport streets are infrastructure designed and used on the bus' conditions. At the same time, the design must be adapted to local conditions with pedestrian traffic in particular in the centre of the city.

(Compare with pedestrian streets designed and used on the conditions of pedestrians)

With separate bus ways

- public transport can achieve close contact with the buildings
- increases clarity
- traveling time is shortened and more reliable
- better prioritisation with signals can be obtained
- public transport becomes more competitive

Example of busways



THE STOP

BRT bus stops are more stations than simple stops.

The following properties are part of the bus stops

- Straight drive-in approach
- Platforms with level-free entrances, perhaps marking of door positions
- Spacious waiting areas with the roof the entire length of the bus and with sitting areas
- Good lighting, static information, real-time information, interactive information screens for announcements
- Possibility for purchasing tickets



Some examples of bus stops. Bottom image from TVM, Paris. Designed weather protection with logotype, information and ticket machines are used to give clearer identity.

THE VEHICLE

The vehicle should have its own identity and design that provides a clear signal value, increased understanding and makes the vehicle easy to recognise.

The door openings should be wide for quick entrance and exit and at least one should be adapted for people with reduced mobility with a level entrance and automatic ramp or similar. The vehicle must also be designed according to conditions of traffic. The main routes of the inner city are optimised for maximum capacity.

In the case of articulated buses, four wide door openings is desirable, for bi-articulated buses five. A BRT bus in suburban traffic or similar, where the journeys are longer, can be optimised by thinking of more seats. Quiet and exhaust-free vehicle through electrification and hybrid solutions provide good comfort in the surroundings and also makes it possible to build stops/stations under roofs and indoors.



THIS SHOULD BE CONSIDERED WHEN INTRODUCING BRT SOLUTIONS

<i>COMMON OBJECTIVE</i>	<i>OPEN AND INCLUSIVE WORKFLOW</i>
<i>LONG-TERM SYSTEM</i>	<i>ANCHORING IN THE GENERAL PUBLIC AND BUSINESS COMMUNITY</i>
<i>CLEAR RESPONSIBILITY AND COMMITMENT</i>	<i>FINANCING SECURED FROM INVESTMENT TO OPERATIONS</i>

BRT is a new promising innovation for Sweden and for those who want to invest in capacity strong and innovative public transport solutions. This brochure is a summary of the report "Guidelines for attractive public transport with a focus on BRT", which has been developed by a group of experts within the public transport industry. The report is available in Swedish and can be downloaded at www.x2ab.se.

There are many BRT solutions internationally, often in very large cities. In the Guidelines, however, we look at the question of how BRT can be adapted to Swedish conditions in our large and medium-sized cities. It is about solutions that can meet the needs of attractive and capacity strong public transport in the range between ordinary main bus lines and metro/local trains. It can be an alternative to, or a first step in preparation for a light rail solution.

Much of the advice in the Guidelines can also be applied to light rail/trams and to raise the quality of bus traffic. The Guidelines are addressed to decision-makers and all those

who participate in developing public transport and attractive cities. The Guidelines will provide support and inspiration for continued action and contribution to the continued development of public transportation and the goal of doubling the market share of public transport. The report can also increase the knowledge about the possibilities of public transportation in contributing to a sustainable urban development. There is also an interest internationally to take part in this type of planning basis.

Stockholm in January 2015
Charlotte Wäreborn Schultz
CEO X2AB



The Guidelines have been developed within the framework of an X2AB project in cooperation with the Swedish Bus and Coach Federation with the assistance of a broad group of experts and with the involvement of public transport operators, industry, public authorities and universities. The Swedish Transport Administration and the Swedish Energy Agency have provided financial support. The Guidelines are based on research and experience at the national and international level and present guidelines, principles and examples of good solutions which can be applied in the design of BRT solutions in large and medium-sized cities. There are by today ongoing planning of demonstrations of BRT in Stockholm, Malmö, Borås and Karlstad. Other cities have also shown interest in participating in the continued work.

The English edition of the BRT Guidelines has been developed with the support of SAMOT, Karlstad University (The Service and Market Oriented Transport Research Group) and Bil Sweden, the Swedish trade association for manufacturers and importers of cars, trucks and buses.

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