Transit Strategies

BUS RAPID TRANSIT

Since the late 1990s, nearly 200 cities around the world have developed Bus Rapid Transit (BRT) services that can provide light rail-like service without the high costs associated with rail infrastructure. BRT typically has lower capital and operating costs than Light Rail Transit (LRT) and faster, more reliable, and more easily identifiable service than typical buses.

Healthline BRT (Cleveland, OH)

BRT Benefits

BRT has become popular largely for the following reasons:

- **Higher Ridership** - A 2012 GAO study reported that over half of the BRT systems that it examined increased ridership by over 30% in their first year of operation.\(^1\)
- **Service Quality** - BRT is faster, more convenient, more comfortable and more attractive than regular bus service.

**Affordability** - The cost to construct a full featured BRT system is typically less than half of the cost of light rail, and operating costs are not significantly higher than for regular bus service.

**Image** - Well branded BRT services attract favorable attention to themselves and also to other available transit services.

**BRT Service Characteristics**

BRT service is fast, frequent, and direct, and operates from early morning to late night. These attributes make the service more convenient than regular bus service and more competitive with travel by automobile.

- Fast Service, similar to light rail, through the use of dedicated lanes
- Frequent Service, typically every 10 minutes or less
- Direct, operating along major arterials and without deviations
- Long Span of Service, often 18 hours a day or more

BRT stations are spaced farther apart than those of local bus service—typically every ¼ to ½ mile. This reduces delays due to frequent stops and starts, and passengers are often willing walk a bit more to faster service than closer to slower service.

Additionally, an advantage that BRT has over LRT is that service can operate beyond the ends of the BRT facilities, since buses are not constrained by tracks. BRT can provide its own “feeder” service by operating locally from beyond the BRT line.

**Other Key BRT Elements**

BRT combines a number of physical elements together to produce an attractive and compelling service:

**Unique Identity**

Rail lines typically have strong identities that help to increase ridership, and BRT lines can be similarly branded to produce clear and positive public recognition. The most common strategy is

Silver Line Branding (Boston, MA)  
SWIFT Branding (Everett, WA)
to distinguish BRT through a stylized vehicle design. Other common elements include distinct
names, logos, color schemes, typography, station signage, and marketing materials.

**BRT Vehicles**

Virtually any type of vehicle can be used for BRT service, ranging from standard transit buses to
specially designed vehicles. However, features commonly found on BRT vehicles include wide
doors and low floors or raised platforms, both of which allow for faster boarding and alighting.
Seating is often comparable to that provided for rail service.

**Bus Running Ways**

BRT usually operates in exclusive bus running ways, one of the following two types.

**Grade Separated Busways** that are completely exclusive rights-of-way, often in former rail
rights-of-way. Examples include the East, West, and South Busways in Pittsburgh, PA; the
South Dade Busway in Miami-Dade County, FL; the Orange Line in Los Angeles, CA; and
CTfastrak in Hartford, CT.

**Exclusive Bus Lanes on Arterial Streets**, which can be in either the center of streets or in
curb lanes. Exclusive bus lanes can be separated from general traffic by physical elements such
as curbs or by striping. This is the most common type of US operation.
In many cases, bus lanes are also shared with other uses; for example, bicycles or taxis. In some areas, curb lanes are used as bus lanes during peak periods and for parking during off-peak periods. Bus lane options can vary along the length of a BRT system.

**Transit Signal Priority**

Signal priority modifies normal traffic signal operation to facilitate the movement of transit vehicles by changing the signal to green early or extending the green signal until the bus passes through. This technology can reduce bus travel times by 5% to over 20%. Signal priority is typically implemented in conjunction with exclusive bus lanes.

**BRT Stations**

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<th>BRT Station (Brisbane, Australia)</th>
<th>Healthline Station (Cleveland, OH)</th>
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BRT systems typically have stations that are similar to light rail stations, with specific design features varying depending upon passenger volumes, location, type of facility, and available space. These typically include local transit connections and other mobility services.

**Level Boarding**

BRT service can be designed to provide for level boardings, typically accomplished through the use of high-level platforms or low-level buses to allow passengers to board and alight faster, which greatly reduces dwell times. Level boarding also eliminates the need for lifts for passengers with disabilities and the elderly.

**Automatic Vehicle Location and Real Time Information**

Automatic vehicle location (AVL) systems can be used to manage bus service to regularize the intervals between buses, thereby minimizing passenger waiting time. AVL can also be used to provide real-time bus status information. Real time passenger information in stations can inform passengers when buses will actually arrive or depart from stations, which reduces some of the uncertainty that is often associated with bus service.
Fare Collection

Off-board fare collection can significantly reduce dwell times at stations by eliminating the time involved for passengers to pay fares as they board vehicles. Ticket vending machines at stops and stations allow passengers to purchase a ticket before boarding the bus, eliminating the time involved in collecting fares as part of the boarding process.

Effective Connections

Effective BRT services should be well-connected to other transit services and the surrounding environment. Major BRT lines, like rail lines, become part of the transit system backbone with connections to other routes. Like all transit services, most passengers will access them by walking, and thus there must be effective pedestrian connections between BRT lines and the areas they serve. Comfortable pedestrian access becomes even more important when BRT services operate along fast and wide arterials roads.
Flexibility

A key advantage of BRT is flexibility. While LRT must have rails along its entire length, BRT can operate for most of its length in bus lanes, but then operate in normal traffic in areas where there is no room for bus lanes. Thus, BRT can often be implemented in areas where rail is infeasible.

However, the flexibility often leads to incomplete implementation of BRT. To minimize costs and respond to other issues, most American BRT systems are implemented with only some of the components listed prior. The Institute for Transportation and Development Policy (ITDP) has developed a BRT rating standard of Gold, Silver, Bronze, or Basic. In the United States, no BRT services are rated as Gold or Silver, and only five are rated as Bronze (Cleveland’s Healthline, Los Angeles’s Orange Line, Pittsburgh’s East Busway, Eugene’s EmX, and Las Vegas’s SDX). Most of the services in the United States that are billed as BRT are rated by ITDP as “not BRT.”

Keys to Successful BRT

The development of successful BRT consists of the packaging of the elements described above that work together to provide service that is Convenient, Comfortable, Memorable, and Connected.

<table>
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<th>What?</th>
<th>How?</th>
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| CONVENIENT | • Attractive service plan  
| Fast | • Minimize compromises  
| Direct | • Limited stops  
| Frequent | • Bus lanes/queue jump lanes  
| Long Hours | • Transit signal priority  
| Real Time Passenger Info | • Self-service fare collection  
| • Web and station-based real-time info |
| COMFORTABLE | • Specialized buses  
| Enhanced onboard experience | • Stations and stops with high quality amenities  
| Attractive and secure waiting environment | |
| MEMORABLE | • Branded buses  
| Highly visible | • Branded stations/stops  
| Easy to recognize | • Simple service structure  
| East to understand | • Clockface schedules  
| CONNECTED | • Bus/rail connections  
| To other transit | • Comfortable pedestrian access/street crossings  
| With other modes | • Bicycle connections/bikeshare  
| With surrounding environment | • Complete streets approach  

Examples of Bus Rapid Transit

Curitiba, Brazil

Curitiba, Brazil is generally credited with inventing modern “full” BRT that operates essentially the same as light rail. Curitiba’s BRT service, which began in the mid-1970s, provides frequent
service with long bi-articulated (three section) buses that operate within exclusive bus lanes. The buses serve high platform tube-shaped stations that provide for prepayment of fares, enclosed waiting areas, and level boardings. The system is used by over 2 million passengers per day and was the source of inspiration for most full BRT services developed since that time.

**Curitiba BRT Center Running Service**  
**Curitiba Station**

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**Cleveland, OH**

Cleveland’s Healthline is the most full-featured BRT services in the United States. The line runs for 6.8 miles from East Cleveland to downtown Cleveland via the city’s Medical District, with distinctive full featured stations and exclusive bus lanes. Construction of the BRT line was accompanied by streetscape and other corridor improvements as part of an overall effort to improve transit service and revitalize Cleveland’s Euclid Avenue corridor. Healthline service is 12 minutes, or 34%, faster than the local service it replaced, and ridership increased by over 60%. The project has attracted over $5.8 billion in transit-oriented development, or $115 for every $1 of transit capital cost.

**Cleveland Healthline**
Eugene, OR

In Eugene, OR, which has a similar population as Providence, Lane Transit (LTD) has developed EmX BRT services. The first line was the Green Line, which was a four mile long route between downtown Springfield and downtown Eugene with 10 stops. That first line opened in 2007 and within a year, ridership in the corridor doubled. In 2011, LTD developed its second line, the Gateway Line, and in 2017, extended the Green Line further west.

EmX service operates in a mix of dedicated lanes and regular traffic – approximately 60% in dedicated lanes and 40% in regular traffic. This mix illustrates compromises to make EmX service fit within available right-of-way. The system also uses special buses with two sets of doors on the left and three on the right, allowing loading from platforms on either side (most of the right hand side platforms can only accommodate the rear two doors).

Boston, MA

In Boston, the MBTA has developed two sets of Silver Line BRT services, which have some significantly different characteristics that illustrate the “mix and match” approach often taken with BRT services:

- The first Silver Line service was developed between Dudley Square in Roxbury and Downtown Crossing. It is an arterial BRT line with most service operating in curbside lanes along most of its length along Washington Street, but with mixed-traffic operations at the two ends. A second line was subsequently added along Washington Street that operates between Dudley Square and South Station.
- The second set of services operates between South Station, the Seaport District, Logan Airport, and Chelsea. All of these services operate in a bus tunnel between South Station and the Seaport District, where they emerge and operate in mixed traffic. One route circulates through the eastern end of the Seaport District, and the other two operate on local streets to operate in mixed traffic through the Ted Williams tunnel to East Boston. Once in East Boston, one route circulates in mixed-traffic through Logan Airport, and the other proceeds to Chelsea via dedicated bus lanes constructed in an old railroad right-of-way.
Potential BRT Service in Rhode Island

BRT would be a new service type for Rhode Island. At present, the R-Line provides some BRT-features, but operates in mixed traffic. Given its high ridership, it would be a candidate to be upgraded to BRT service. The upgrading of R-Line service to BRT could also include an extension to TF Green Airport. Based on high ridership levels, additional BRT corridors would include:

- Olneyville Square – Downtown Providence via Broadway or Westminster Street
- East Providence – Downtown Providence via College Hill and the transit tunnel,

These two lines could also be combined into a single east-west line.

One major challenge in implementing BRT in the metro Providence area will be available space. Most of the roads in candidate corridors are two lane roads with parking. The development of dedicated bus lanes would necessarily require the elimination of parking which is always controversial and generates significant opposition. As described in the Rapid Bus strategy paper, the development of Rapid Bus service could provide an alternative that would preserve all or most parking, but at the cost of slower service.