

BUS RAPID TRANSIT vs. LIGHT RAIL TRANSIT

A Side-by-Side Comparison of Competing Mass Transit Options

This document compares the pros and cons of bus rapid transit (BRT) systems and light rail transit (LRT) systems. There are many upsides and downsides to both mass transportation options.

In summary, LRTs can only serve a limited number of stations, but those stations can stimulate intense development, with increased density (residents, employees and business activity per acre), higher per capita transit ridership and walking trips, and lower per capita vehicle ownership and trips.

Meanwhile, BRTs can serve more destinations, including dispersed, suburban activity centers, but attracts fewer riders per capita and has little or no effect on land-use patterns (i.e., economic development). Buses tend to have lower costs per vehicle-mile, but rail often has lower costs per passenger-mile due to higher load factors.

Following is more insight on the “Pros” and “Cons” of each mass transit option:

BRT PROS	LRT PROS
Flexibility. Bus routes can change and expand when needed, for example, if a roadway is closed or if destinations or demand changes.	Greater demand. LRT attracts more discretionary riders—those who leave cars at home—than BRT.
Requires no special facilities. Buses can use existing roadways and general traffic lanes can be converted into a busway.	Greater comfort due to larger seats with more legroom, more space per passenger and smoother and quieter ride.
Several routes can converge onto one busway thereby reducing the need for transfers. BRT therefore is more suitable for dispersed land use, such as suburban locations.	Greater maximum capacity. Rail requires less space and is more cost effective on high-volume routes.
Lower capital costs for initial infrastructure investment. A GAO study found that in 2000 dollars the capital costs for the various types of BRT systems range from a low of \$200,000 per mile for an arterial street-based system to \$55 million per mile for a dedicated busway system.	More voter support for rail than for buses. A December 2005 Harris Poll found 44% of voters support LRT while only 23% support BRT.
Lower operating costs per passenger-mile <i>where transit demand is low.</i>	Lower operating costs per passenger-mile <i>where transit demand is high (i.e., in D.C. region).</i>
Is used more by people who are transit-dependent, so bus service improvements provide greater equity benefits.	More positive land-use impacts. Rail tends to be a catalyst for more accessible development patterns. Developers are more likely to locate new business, residential or retail development along a LRT line than a BRT. This positive economic impact offsets on average higher capital costs.
Can serve a larger geographical area.	Increases property values near transit stations.

Can phase in service instead of waiting for entire system to be completed.	Less air and noise pollution , particularly when electric-powered.
	Higher ridership. BRTs average 15,600 riders per day across the country while LRTs average 29,000 daily riders.
	Rail stations tend to be more pleasant than bus stations , so rail is preferred where many transit vehicles congregate.
	LRTs have helped preserve and revitalize downtown areas of major U.S. cities (e.g., New York, San Francisco and Washington, D.C.).
	More “New Starts Program” investment in LRT (\$4.67 billion) versus \$831 million for BRT (FY2001).
	Greater travel speed and reliability where rail transit is grade separated.
	Improves community image.
	Provides superior service quality (e.g., speed, comfort and convenience).
	Less environmental impact , especially if electric trains are used.

BRT CONS	LRT CONS
Buses have poor public image. No matter how comfortable the seats, a bus is still a bus!	Higher initial costs. LRTs have higher infrastructure investment costs than BRT.
Poor quality service. Service in many urban centers is deficient.	Federal support waning. U.S. government appears to be on a pro-BRT, anti-LRT bent.
Flexibility and decentralization have downsides. These result in a lack of system visibility and permanence that drives public perceptions of unreliability and disorganization.	Higher infrastructure costs. A GAO study found that in 2000 dollars the cost of most LRTs range from \$12.4 million per mile to \$118.8 million per mile.
Many BRT-dedicated lanes have been converted to HOV lanes.	Skewed Benefits. Rail investments are inequitable because they primarily benefit higher-income people and drain funding from basic bus service used by lower-income, transit-dependent people.
Hit-or-miss funding eligibility. BRTs that do not operate on separate, dedicated lanes are not eligible for funding through the federal “New Starts Program”.	More stops=Longer trips. LRTs with more stations and more-frequent stops have lower overall speed.
A temporary solution. Many BRTs are temporary solutions until an LRT system is built. <i>(See case study below.)</i>	

<p>Less voter support. A December 2005 Harris Poll found only 23% of voters support BRT while 44% support LRT.</p>	
<p>Can cause traffic disruption. BRTs with signal priority systems (changes signal lights to green when a bus approaches) cause severe traffic disruptions to traffic flow on major cross streets. This doesn't alleviate traffic it just redistributes traffic congestion problems.</p>	
<p>Lower ridership. BRTs average 15,600 riders per day across the country while LRTs average 29,000 daily riders.</p>	
<p>Less "New Starts Program" investments in BRTs (\$831 million) than LRTs (\$4.67 billion) (FY2001).</p>	
<p>Higher operating & maintenance (O&E) costs. A comparison of St. Louis BRT and LRT systems over a 10-year period showed the BRT with an annual average O&E of \$104.6 million vs. \$26.2 million for the LRT. Further, the study found that in 2005 the total cost per passenger mile was \$0.97 for the BRT compared to \$0.82 for the LRT.</p>	
<p>More susceptible to cost overruns. A 1999 GAO study of approved "New Start Programs" found that 2 BRTs had exceeded estimated budget (by 7.4% and 27.8%, respectively), while all 7 LRT projects had come in at or below estimated budget.</p>	

A LOCAL BRT CONVERSION CASE STUDY:

Northern Virginia suburbs of Washington, D.C., 1970-1996. The Shirley Busway was deemed a great success upon its opening in 1970. The pre-existing Route 18 was expanded from three trips per day (without subsidy) to approximately 30 trips with subsidy—yielding a substantial increase in ridership.

However, with long gaps between buses, political pressure grew to convert the busway into an HOV lane, opening it up for use by automobiles and other private motor vehicles. Ridership peaked in 1980-81 during the second energy crisis. Subsequently it declined 67% as costs increased sharply. At the same time, transit ridership in the National Capital area ballooned from 135 million per year to 270 million, mainly because of the introduction of the MetroRail system. In 1996, ridership on the Route 18 Shirley Busway buses had plunged to 2,350 weekday rider-trips.

As MetroRail service was introduced to the Route 18 territory (Springfield, Va.), bus ridership dropped further to 1,650 per day. However, MetroRail patronage in Springfield soared to 13,000, even though bus fares were lower than rail and travel time was approximately equal. Furthermore, the operating cost of rail transit was far less per passenger.