ECONOMIC BENEFITS OF BUS RAPID TRANSIT

This memorandum provides an overview of the business, employment, development, and land use impacts of Bus Rapid Transit (BRT) projects in Canada and the United States.

Introduction

Rapid transit systems are often promoted as offering social, economic and environmental benefits by transforming auto-centric designs into more sustainable urban forms. In the last decade there has been significant interest in bus rapid transit (BRT) in Canada and the United States. From almost no BRT systems twenty years ago, there are now nearly 30 lines operating in North America with at least seven under construction and more than 20 in the planning or design stages. The growing popularity of BRT stems from its relative affordability and potential to be leveraged as an economic development tool. While BRT travel time, schedule reliability and ridership benefits are easily measured and well understood, there is a growing body of research on development and business benefits in North America and around the world.

Globally, the positive development effects of BRT have been well documented in China, Korea, Australia, and Columbia. In Seoul, development of a BRT has led residential developers to convert single-family homes into multi-family apartments[1], created land premiums of 10 percent for residents and 25 percent for retail near BRT stops, and increased employment density by 54 percent.[2] In Bogotá, rental prices dropped an average of 8 percent for every five additional minutes a person must walk to reach a BRT station.[3]

1 Cervero, Robert and Kang, Chang Deok. "Bus Rapid Transit Impacts on Land Uses and Land Values in Seoul, Korea." Transport Policy Vol 18 Issue 1. January 2011.

2 Kag, Chang Deok. "The Impact of Bus Rapid Transit on Location Choice of Creative Industries and Employment Density in Seoul." International Journal of Urban Sciences, Vol. 14, 2011.

3 Rodrigues, Daniel and Targa, Felipe. "Value of Accessibility to Bogotá's Bus Rapid Transit System. Transport Review", Vol 14, Issue 5, 2004.

Within North America, research on the economic impacts of BRT systems has grown significantly in the last ten years, and there are encouraging findings from Canada and the United States. This memo documents the economic benefits of BRT and streetcar projects in several North American cities: Ottawa, Toronto, Cleveland, Los Angeles, Boston, Pittsburgh, Eugene, and New York City. Some streetcar case studies were included due to the similarities in transit priority measures and corridor contexts. The BRT and streetcar benefits documented can be grouped into four thematic categories: development, property values, employment, and business revenue.

Business Benefits

Case Study: Toronto King Street Pilot Project

A 12-month King Street Pilot was initiated in November, 2017. The project spans 3.4km along one of Toronto's busiest corridors, from Bathurst Street to Jarvis Street in inner-city / downtown Toronto. The project introduced dedicated streetcar lanes, moved streetcar stops to the far side of intersections, prohibited left turns, provided right turn advances, and removed parking. Some parking spaces were converted into public spaces, taxi stands, and loading zones. The project included placemaking and public realm improvements like temporary parklets and public art installations designed to increase pedestrian traffic and support local businesses.

Initial protests came from the Toronto Taxi Alliance. In response to the pressure, Council made a partial concession, allowing taxis to conduct business as usual along King Street between the hours of 10 p.m. and 5 a.m. The second wave of protest, which received considerable media attention, came from a small number

of business owners along King Street who claimed that the project was negatively affecting restaurant and retail sales. A report from April 2018[4] analyzed point-of-sale information that showed that customer spending since the pilot began was in-line with seasonal spending patterns of over the past three years.

The report also showed positive transit benefits, including: all-day weekday ridership increased by 13%, transit reliability improved by 18%, and transit travel times improved by 5 minutes in each direction. Additionally, the average car travel time varied by less than a minute compared to pre-pilot and the downtown traffic network was largely able to absorb and respond to the changes in routing that drivers have made.

Figure 1. King Street streetcar with parklet

Case Study: New York Bx21 Select Bus Service

The New York Select Bus Service (SBS) is a high performance rapid bus network that connects residential neighbourhoods to subway stations and other major destinations. In 2008, the Bx12 SBS route improvements included off-board fare payment, low floor buses, dedicated curb-side bus lanes (denoted by overhead signage and high visibility red paint), traffic signal priority and longer spacing between stops. Parking and loading activities are not permitted during peak hours.

In 2013, the New York City DOT[5] studied the economic performance of a five block segment of the Bx12 route compared to similar retail corridors without SBS improvements during the same study period. The findings of the 2013 report showed that the corridor segment with SBS improvements experienced higher levels of economic activity than other similar corridors. The study found that baseline quarterly sales increased by 24% in the first year. By the third year, sales increased by 71% compared to 38% in similar non-SBS corridors[6]. The study also found that transit travel times improved by 20%, ridership increased by 32%, the overall transit experience improved.

Figure 2. Fordham corridor before (left) and after (right) BRT improvements

Development Benefits

A 2015 US national study of BRT development outcomes analyzed development patterns within 800 metres of BRT corridors between 2000 and 2007 (pre-recession) and from 2008 to 2015 (recession and recovery period). The study found that BRT corridors increased their share of new office space by a third, from 11.4 percent to 15.2 percent. The study also found that although new multi-family apartment construction within 800 metres of BRT the corridor was relatively modest, its share has more than doubled since 2008.[7]

4 City of Toronto. “King Street Transit Pilot April Update”. April, 2018.

5 New York City Department of Transportation. “The Economic Benefits of Sustainable Streets”, 2013.

6 Ibid.

7 Nelson, Arthur and Ganning, Joanna. “National Study of BRT Development Outcomes”. National Institute for Transportation and Communities (NITC), 2015.

Depending on the corridor context, development market, and regional economy, the development return for every dollar spent on transit ranges from $0.83 (Los Angeles' Orange Line) to $115 (Cleveland's HealthLine). Research carried out by the Institute for Transportation and Development Policy (ITDP) found that the most important preexisting factors in BRT cities and corridors was regional market strength and the quality of the developable land through which the corridor runs.[8] If either of these factors is strong, development impacts can be significant.

City	BRT Line	Development per Transit Dollar Invested (US$)
Los Angeles	Orange Line	$0.83
Boston	Waterfront Silver Line	$1.39
Ottawa	Transitway	$1.71
Pittsburgh	MLK Jr. East Busway	$3.59
Eugene	Emerald Express (EMX)	$3.96
Boston	Washington Street SilverLine	$20.97
Las Vegas	Strip & Downtown Express (SDX)	$42.28
Seattle	South Lake Union (SLU) Streetcar	$53.57
Kansas City	Main Street Metro Area Express (MAX)	$101.96
Cleveland	HealthLine	$114.54

Case Study: Pittsburgh Martin Luther King, Jr. East Busway

Pittsburgh's Martin Luther King, Jr. East Busway BRT was built on a former freight rail line. The busway operates on a fully dedicated right of way and ends just short of the city centre, carrying 24,000 passengers per weekday.[9] Previously, the corridor had limited development but has stimulated over $900 million in development within a 450 meter radius of the BRT stations following construction of the busway.

Case Study: Boston Silver Line

The Silver Line was opened in 2004. A 2007 United States Department of Transportation and Federal Transit Administration Silver line Project Evaluation report documented the redevelopment around several stations. The report found that although none of the development can be solely attributed to the BRT, the existence of the Silver Line was a key factor in stimulating development, and given the parking freeze, most of the development would not be possible without it.

The Silver Line Waterfront Environmental Impact Statement estimated there would be an increase of about 5 million square feet of development between 1986 and 2010 in the "low growth" scenario and 12 million square feet in the "high growth" scenario. As of 2007, the development around stations totaled over 12.8 million square feet; more than even the high estimate. A desktop review of the Silver Line Waterfront Stations shows continued redevelopment around stations, including recently constructed mixed-use condominium and commercial towers.

Figure 3. Development near a Silver Line BRT station in Boston

Case Study: Cleveland HealthLine

Although Cleveland is a struggling industrial city that experienced a significant downturn during the 2009 economic crisis and has a weak regional property market, the HealthLine stimulated $5.8 billion in development investment.

The HealthLine helped revitalize the Downtown, MidTown and University Circle employment centres. The development investment included office, retail, institutional, and cultural buildings (including the Museum of Contemporary Art that opened in 2012).

The BRT project included a $50 million investment in vehicles and stations, and $150 million invested in street improvements and public infrastructure along the corridor.

8 Hook, Walter, Stephanie Lotshaw and Annie Weinstock. "More Development for your Transit Dollar: An Analysis of 21 North American Transit Corridors." ITDP, 2013.

9 Ibid.

Figure 4. Development along the HealthLine corridor, around University Circle, which has a concentration of education and medical institutions.

Case Study: Ottawa Transitway

Ottawa has one of Canada's oldest BRT systems. Ottawa's Transitway is a fully grade separated system, with the exception of downtown, where the BRT buses enter curbside bus lanes. Since the system opened in 1983 there has been over one billion dollars invested in new development around the Transitway stations.[10] Some examples include the St. Laurent Shopping Centre, connected to the Transitway via its lower level, added 80 retail outlets in 1987. In 1989, six new office buildings, a cinema complex and community shopping centre opened around Blair Station. The Rideau Centre downtown, which is served by all BRT routes and numerous local routes, is currently undergoing renovations. 60% of shoppers get to the Rideau Centre by transit.

Figure 5. BRT and local bus terminal at St. Laurent Shopping Centre in Ottawa

10 Federal Transit Administration. "Bus Rapid Transit and Development: Policies and Practices That Affect Development Around Transit", 2009.

Property Value Benefits

Cities currently operating BRT vary in size, density, and other characteristics which collectively contribute to different results regarding the impacts of BRT services on land value; however, multiple studies have found that property values near BRT stations were higher than those that are farther away.

A study by the American Public Transportation Association (APTA) and the National Realtors Association (NRA), showed BRT lines were beneficial in stabilizing home prices during the 2007 recession.[11] A 2015 NITC study evaluated the association between office properties located within 800m of five BRT lines and their rents (Cleveland, Eugene, Kansas City, Las Vegas, Pittsburgh) and found evidence of an office rent premium for locations within a BRT corridor.[12]

Case Study: Pittsburgh Martin Luther King, Jr. East Busway

A 2017 study found an inverse relationship between distance to a BRT station and property values, concluding that a residential property that was 1,000 feet away from a station was valued $9,475 less than a property that was 100 feet away from the station.[13]

Case Study: Eugene Emerald Express BRT

Eugene, OR is one of the smaller, lower density US cities operating a full-featured BRT service. A 2017 NITC study analyzed 2005, 2010 and 2016 data to understand how home prices differ based on the distance from BRT stations.[14] The study found that for every 100 metres decrease in distance to a BRT station (i.e. getting closer to the station), the average sale price increased by $823 in 2005, $1,056 in 2010 and $1,128 in 2016. These findings suggest that proximity to a BRT station contributes to an increasingly positive impact on the sale prices of single family homes.

11 American Public Transportation Association. "The New Real Estate Mantra: Location Near Public Transportation", 2013.
12 Nelson, Arthur and Ganning, Joanna. "National Study of BRT Development Outcomes". National Institute for Transportation and Communities (NITC), 2015.
13 U.S. Department of Transportation. "Land Use Impacts of Bus Rapid Transit: Effects of BRT Station Proximity on Property Values along the Pittsburgh Martin Luther King, Jr. East Busway", November 2009.
14 Perk, Victoria et al. "Impacts of Bust Rapid Transit (BRT) on Surrounding Residential Property Values." Portland State University Transportation Research and Education Center (TREC) and National Institute for Transportation and Communities (NITC), 2017.

Case Study: Boston Silver Line

The Silver Line has stimulated a considerable amount of redevelopment investment and according to the APTA and NRA study, the transit catchment area did 227 percent better in retaining property values than the region as a whole between 2006 and 2011. The Washington Street and E Berkley Street stations experienced the highest change in average residential sale prices, at 317 percent.[15] And a 2013 study found that condominiums along the Silver Line had a 7.6 percent per square foot premium.[16]

Employment Benefits

Nelson and Ganning (2015) examined employment change along nine U.S. BRT corridors, and found that BRT lines attract jobs. After the 2007 recession, areas near BRT lines saw more growth in middle- and high-wage jobs as compared to areas with similar characteristics that did not have BRT. However, the share of lower-wage jobs decreased possibly because rising property rents may have moved lower-wage jobs elsewhere.[17] A 2016 study from the University of Minnesota found positive employment outcomes around BRT stations. The study found that the lure of fixed guideway investment has a greater potential for attracting jobs to dedicated runningway BRT stations, as on the Orange and Gold Lines, than other locations.[18]

Case Study: South Lake Union Streetcar

The South Lake Union Streetcar connects the South Lake Union neighborhood to downtown Seattle, Washington. Construction of the project began in 2006, and service started in December 2007. The primary purpose of the project was to encourage investment in the South Lake Union neighborhood and decrease traffic congestion during commuting hours.

There is a close relationship between land use planning and transit improvements in attracting new development and jobs to the South Lake area. In 2004, South Lake Union was designated as an urban center in Seattle's Comprehensive Plan, to reflect the significantly increased expectations for housing and job growth. One of the major companies to move into the area before the streetcar opened was Amazon as a step to gather all Amazon buildings previously scattered throughout Seattle. Another major employer in the area was the University of Washington's School of Medicine, which started to expand when the South Lake Union Streetcar project was halfway through construction. The University also developed a new Health Campus around that time. According to information obtained from interviews, both employers recognize the streetcar as a key driver for their development.

Between 2008 and 2013, following the South Lake Union Streetcar opening, commercial space increased to 4.8 million square feet and the number of residential units increased to 2,605. Motivated by the investments of large employers such as Amazon, many other companies and businesses, such as biotech firms (PATH, NanoString Technologies Inc., Allen Institute), restaurants and retailer shops, and small businesses moved to the neighborhood. Five branch banks opened in the South Lake Union neighborhood after the streetcar started service.

Based on interviews with some of the major employers in the South Lake Union neighborhood, it is estimated that about 10% of the total jobs created since the opening of the South Lake Union Streetcar were directly related to the newly provided transit access. It is estimated that 1,227 jobs were created as a direct result of the South Lake Union Streetcar project. [19]

Figure 6. South Lake Union Streetcar running through the innovation district in Seattle.

15 American Public Transportation Association. "The New Real Estate Mantra: Location Near Public Transportation", 2013.
16 Federal Transit Administration. "Land Use Impacts of Bus Rapid Transit: Phase II—Effects of BRT Station Proximity on Property Values along the Boston Silver Line Washington Street Corridor" Report Summary.
17 Nelson, Arthur and Ganning, Joanna. "National Study of BRT Development Outcomes". National Institute for Transportation and Communities (NITC), 2015.
18 Guthrie, Andrew et al., "Economic Development Impacts of Bus Rapid Transit". Center for Transportation Studies, University of Minnesota, Report #11, 2016.
19 American Association of State Highway and Transportation Officials (AASHTO), "EconWorks Case Study: South Lake Union Streetcar".

Case Study: Eugene Emerald Express BRT

In Eugene, Oregon, the Emerald Express Green Line BRT opened in 2004 and carries an average of 10,000 passengers per weekday along a route that connects the University of Oregon with downtown Eugene. There was a concerted effort to encourage mixed-use development around transit stations, which has helped to stimulate economic development along the corridor. Between 2004 and 2010, 26,500 jobs were created, nearly half of which were located within a quarter-mile of a BRT station.[20] Additionally, by 2010, there had been a 5% decline in employment of all jobs further than a half-mile from a BRT station, while jobs within a quarter mile of stations increased by 10%.[21]

Case Study: Cleveland HealthLine

According to a 2017 study from the Cleveland State University (CSU) Centre for Population Dynamics, the number of jobs nearly doubled along Euclid Avenue following completion of the HealthLine BRT in 2008.[22] From 2002 to 2008, employment dipped 10.5 percent along the 6.5 km corridor, a period that coincided with two years of BRT and street improvement construction. The number of jobs in the same zone nearly doubled between 2008 and 2014, rising from 36,850 to 72,080. The report found that investing in BRT can encourage clustering of new economy jobs in health care and education, fields that constitute the majority of employment along the corridor. According to the CSU report, the HealthLine is "a case of inducing job growth and job clustering with transit investment".

Critics of the findings suggest that the HealthLine was a boondoggle and unnecessary because the previous bus line, the No. 6, was the most heavily used route in the region. Yet, after nearly a decade of operation, studies have consistently shown that the HealthLine improved transit service and stimulated strong economic growth. A 2012 report to Congress showed that ridership on the HealthLine grew 31 percent in comparison to the old No. 6 bus and run times decreased by 21 percent.

Summary

There is a growing body of research that demonstrates the economic benefits of BRT and streetcar projects in cities across North America. Studies have shown that improvements to streetcar operations along King Street in Toronto (including restrictions to parking and general traffic operations), has not negatively impacted customer spending along the corridor. In New York, Select Bus Service improvements increased retail sales along the Fordham corridor.

Research also shows development activity and property value increases around BRT corridors in cities like Pittsburg, Boston, Cleveland, Ottawa, and Eugene. In Seattle, the South Lake Union streetcar was a key driver in attracting employers like Amazon. In Cleveland, the Health Line saw clustering of new employment along the BRT corridor.

Cleveland and Pittsburgh are examples of best practice BRT transit-oriented development. Unlike BRT or streetcar projects in Seattle, New York or Boston, Cleveland and Pittsburge face serious economic difficulties and fiscal constraints as a result of deindustrialization. These cities have demonstrated that BRT investments were a cost-effective way to bring greater mobility as well as economic activity back to their communities.

20 Nelson, Arthur C. et al. "Bus Rapid Transit and Economic Development: Case Study of the Eugene-Springfield, Oregon BRT System," Metropolitan Research Center, University of Utah, November 13, 2011.
21 Ibid.
22 Piiparienen, Richey and Russell, Jim. "Transportation's Role in the Economic Restructuring of Cleveland". Cleveland State University Center for Population Dynamics Quarterly Brief, January 2017.