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LEFT BEHIND AT THE STATION:

An Analysis of Mass Transit Spending in Ohio

Photo by Ken Prendergast

Photo by Marc Conte

Sierra Club - Ohio Chapter Report

May 2001

Left Behind At The Station: An Analysis of Mass Transit Spending in Ohio

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Lead Writer: Shannon Harps
Assistant Writers: Marc Conte and Shane Hankins

Special thanks to Marc Conte and Ken Prendergast for the cover photos. The bus is at the popular Broad and High Streets stop in Columbus. The light rail system is located in Cleveland running past the Crittenden Apartments.

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The Sierra Club is one of the nation's oldest and largest environmental organizations with 650,000 members nationwide. The Ohio Chapter, chartered in 1968, has over 16,000 members. The Sierra Club has been a leader in an effort to promote more livable communities that provide people with a variety of safe transportation choices.

Sierra Club - Ohio Chapter
36 West Gay Street, Suite 314
Columbus, Ohio 43215
Tel: (614) 461-0734
Fax: (614) 461-0730
www.ohio.sierraclub.org

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Executive Summary

The Surface Transportation Policy Project has documented that for the first time since World War II, growth in Americans' use of buses and trains is consistently outpacing growth in driving. A report by the American Society of Civil Engineers predicts that transit ridership will increase dramatically over the next decade. These reports are promising but, unfortunately, Ohioans are predominately dependent on their automobiles to commute to work. The average percentage of residents in Cleveland, Columbus, and Cincinnati taking transit is only about 6%.

The 1999 National Transportation Database provided by the Federal Transit Administration (FTA) was utilized to analyze mass transit spending in Ohio and across the United States. The mass transit information is the FTA's most recently available data.

Analysis of the data found that Cleveland had the highest percentage of service population riding all modes during a weekday with 16%. Cincinnati had the lowest costs for both operating expenses per passenger mile and operating expenses per unlinked passenger trip with $0.40 and $2.12 respectively. The state of Ohio only provides 5% and 10% of the total operating and capital funds respectively. Cities such as Pittsburgh, Indianapolis, Detroit, Charlotte, Baltimore, and Madison receive higher percentages of state funding, ranging from 4% to 59% higher than Ohio's state funding for mass transit operational costs. Four cities, including Pittsburgh, Detroit, Baltimore, and Madison, also had higher percentages of state funding for capital costs. These cities received 10% to 29% more from their states than those analyzed cities in Ohio.

Further analysis of the data was performed regarding service population riding mass transit on a weekday and service population living in a dense neighborhood with seven units per acre or more in Ohio's analyzed cities. A significant relationship was found between the percentage of people living in dense neighborhoods and high ridership.

As a result of mass transit spending the Ohio Chapter of the Sierra Club conclude and recommend the following:

Conclusions:

- Light rail and heavy rail tend to be more cost effective to operate than buses
- Systems with higher ridership rates tend to be more cost effective
- Many other urban transit systems receive a higher percentage of their funds from their state government

Recommendations:

- The State of Ohio needs to increase funding for mass transit in its urban areas
- Cities need to build neighborhoods that are denser and transit oriented, to increase ridership
- More cities in Ohio need to explore the merits of building light rail and heavy rail systems

Terminology

The following terms for transit modes, ridership, and expenses are used throughout this report.

Transit Mode Definitions:

- ***Bus:*** A transit mode comprised of rubber-tired passenger vehicles operating on fixed routes and schedules over roadways. Buses are powered by diesel, gasoline, battery or alternative fuel engines contained within the vehicle.
- ***Trolleybus:*** A transit mode comprised of electric rubber-tired passenger vehicles, manually steered and operating singly on city streets. Vehicles are propelled by a motor drawing current through overhead wires via trolleys, from a central power source not on board the vehicle.
- ***Light Rail:*** A transit mode that is an electric railway with a light volume of traffic capacity compared to heavy rail. It is characterized by passenger rail cars operating singly (or in short, usually two-car, trains) on fixed rails in shared or exclusive right-of-way, low or high platform loading, and vehicle power drawn from an overhead electric line via a trolley or a pantograph.
- ***Heavy Rail:*** A transit mode that is an electric railway with the capacity for a heavy volume of traffic. It is characterized by high-speed and rapid acceleration; passenger rail cars operating singly or in multi-car trains on fixed rails; separate rights-of-way from which all other vehicular and foot traffic are excluded; sophisticated signaling, and high platform loading.

Ridership Definitions:

- ***Passenger Mile:*** A measure of the amount of transit service consumed by passengers. It is the sum of the distances ridden by each passenger.
- ***Unlinked Passenger Trips:*** A measure of the amount of transit service consumed by passengers. It is the number of passengers who board public transportation vehicles. A passenger is counted each time he or she boards a vehicle even though he or she may not be on the same journey from origin to destination.

Expenses Definitions:

- ***Capital Expenses:*** The expenses related to the purchase of equipment.
- ***Operating Expenses:*** The expenses associated with the operation of the transit agency, and classified by function or activity and the goods and services purchased.

Data Sources

The 1999 National Transportation Database provided by the Federal Transit Administration (FTA) was utilized to analyze mass transit spending in Ohio and across the United States. The mass transit information is the FTA's most recently available data and can be found at http://www.ntdprogram.com/NTD/Profiles.nsf/1999+TOC/?OpenView. Service population is equivalent to the county population, therefore data were used from the 2000 U.S. Census. The data can be found at www.census.gov.

The following transit systems were studied in the state of Ohio:

- Central Ohio Transit Authority (COTA)
- Greater Cleveland Regional Transit Authority (GCRTA)
- Dayton-Miami Valley Regional Transit Authority (DMVRTA)
- Cincinnati-Southwest Ohio Regional Transit Authority (Metro)
- Toledo Area Regional Transit Authority (TARTA)
- Canton Regional Transit Authority (CRTA)
- Akron-Metro Regional Transit Authority (AMRTA)

The following transit authorities were studied throughout the nation:

- Port Authority of Allegheny County (Pittsburgh)
- Indianapolis Public Transportation Corporation (Indianapolis)
- Capital Metropolitan Transportation Authority (Austin)
- Bi-State Development Agency (St. Louis)
- Suburban Mobility Authority for Regional Transportation (Detroit)
- Charlotte Department of Transportation (Charlotte)
- Mass Transit Administration, Maryland Department of Transportation (Baltimore)
- Metropolitan Atlanta Rapid Transit Authority (Atlanta)
- Madison Metro Transit (Madison)
- Regional Transportation District (Denver)
- Tri-County Metropolitan Transportation District of Oregon (Portland)
- Massachusetts Bay Transportation Authority (Boston)

Introduction

The Surface Transportation Policy Project, a Washington, D.C.-based organization devoted to improving the nation's transportation system, documented that, for the first time since World War II, growth in Americans' use of buses and trains is consistently outpacing growth in driving.[1] New government and industry figures show that in the past five years, transit use has grown by 21 percent while driving has increased by just 11 percent.[2] This is a dramatic change from the early 1990s when driving grew steadily and transit use decreased by 11.8 percent.[3] This is the first time since the introduction of the automobile that transit use has grown faster than driving for more than 3 years in a row.[4]

A report by the American Society of Civil Engineers predicts that transit ridership will increase dramatically over the next decade.[5] The Society's new "report card" gave U.S. infrastructure an overall grade of "D+" and mass transit a "C."[6] In addition to finding that 58% of roads are in bad condition, the group anticipates that public transit will experience the sharpest growth of any mode of transportation this decade.[7] However, the report says that capital spending on transit would need to increase 41% to keep up with new ridership demands and maintain current conditions.[8]

These reports are promising but, unfortunately, Ohioans are predominately dependent on their automobiles to commute to work. Approximately 90% of the workforce in Ohio's major cities is commuting via cars.[9] The average percentage of residents in Cleveland, Columbus, and Cincinnati taking transit is only about 6%.[10] According to the newly released report by the Texas Transportation Institute entitled *2001 Urban Mobility Study*, residents in these three cities are spending anywhere from 20 to 32 hours in traffic congestion.[11] The study also found that Columbus ranks the ***lowest in the country*** in terms of the Transportation Choice Ratio, which compares relative supply of public transportation to major roads in a metro area.[12] In Columbus there is only 0.09 mile of transit service each hour for every mile of major roadway.[13] The highest ranking went to New York City with 6.3 miles of transit service each hour for every mile of major roadway.[14] The national average was 1.8.[15]

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[1] Surface Transportation Policy Project. 2001. http://www.transact.org/Pressroom/vmt-transit.htm.
[2] Ibid.
[3] Ibid.
[4] Ibid.
[5] American Society of Civil Engineers. 2001. *2001 Report Card for America's Infrastructure*. http://www.asce.org/reportcard/.
[6] Ibid.
[7] Ibid.
[8] Ibid.
[9] Surface Transportation Policy Project. 2001. *Easing The Burden*. http://www.transact.org/Reports/tti2001/default.htm.
[10] Ibid.
[11] Texas Transportation Institute. 2001. *2001 Urban Mobility Study*. http://mobility.tamu.edu/.
[12] Ibid.
[13] Ibid.
[14] Ibid.
[15] Ibid.

The Ohio Department of Transportation (ODOT) is finally acknowledging that more highway lanes will not solve the problem of congestion. A recent article in *The Daily Reporter*, the Columbus daily business and legal newspaper, quoted Brian Cunningham, an ODOT spokesperson, saying, "We can't build our way out of congestion. We're looking at alternatives. We're working with transit agencies and finding different ways to try to combat this problem."[16] Regrettably, as this report will show, state funding for mass transit is not reflecting these statements.

[16] Bournea, R.C. 9 May 2001. "Columbus Ranks Poorly in National Survey of Transportation Choices." *The Daily Reporter*. Front page.

Data Analysis

RIDERSHIP

The relation between service area and average weekday unlinked trips by bus was analyzed within the state of Ohio (Figure 1). Cleveland had the highest percentage of service population riding the bus on a weekday with 13% followed by Cincinnati with 10%. Columbus and Dayton both had 6% riding the bus on a weekday even though our state's capital is almost twice the size of Dayton. Canton had the lowest percentage with 1% or 5,549 average weekday unlinked trips by bus.

Figure 1: Unlinked Trips and Service Population Related to Bus Service

Transit System (Major City)	Service Area	Average Weekday Unlinked Trips by Bus	Percent of Service Population Riding Bus on Weekday
COTA (Columbus)	1,068,978	64,152	6%
GCRTA (Cleveland)	1,393,978	187,192	13%
DMVRTA (Dayton)	559,062	35,559	6%
Metro (Cincinnati)	845,303	86,376	10%
TARTA (Toledo)	455,054	16,311	4%
CRTA (Canton)	378,098	5,549	1%
AMRTA (Akron)	542,899	19,342	4%

Cleveland is the only city in the state of Ohio to offer light and heavy rail service (Figures 2 and 3). The average number of weekday, unlinked trips by light rail in 1999 was 15,395 or 1%. The average weekday unlinked trips were slightly higher for heavy rail with 21,683 or 2% of the service population. However, Cincinnati and Columbus are actively studying the possibilities of providing light rail service in their communities. Cleveland is also studying to expand their existing light rail service.

Figure 2: Unlinked Trips and Service Population Related to Light Rail Service

Transit System (Major City)	Service Area	Average Weekday Unlinked Trips by Light Rail	Percent of Service Population Riding Light Rail on Weekday
COTA (Columbus)	1,068,978	-	-
GCRTA (Cleveland)	1,393,978	15,395	1%
DMVRTA (Dayton)	559,062	-	-
Metro (Cincinnati)	845,303	-	-
TARTA (Toledo)	455,054	-	-
CRTA (Canton)	378,098	-	-
AMRTA (Akron)	542,899	-	-

Figure 3: Unlinked Trips and Service Population Related to Heavy Rail Service

Transit System (Major City)	Service Area	Average Weekday Unlinked Trips by Heavy Rail	Percent of Service Population Riding Heavy Rail on Weekday
COTA (Columbus)	1,068,978	-	-
GCRTA (Cleveland)	1,393,978	21,683	2%
DMVRTA (Dayton)	559,062	-	-
Metro (Cincinnati)	845,303	-	-
TARTA (Toledo)	455,054	-	-
CRTA (Canton)	378,098	-	-
AMRTA (Akron)	542,899	-	-

Dayton is the only city in Ohio and one of five cities in the nation to provide electric trolleybus service to its residents (Figure 4). In 1999, 12,435 average weekday unlinked trips were by trolleybus or 2% of the service population.

Figure 4: Unlinked Trips and Service Population Related to Trolleybus Service

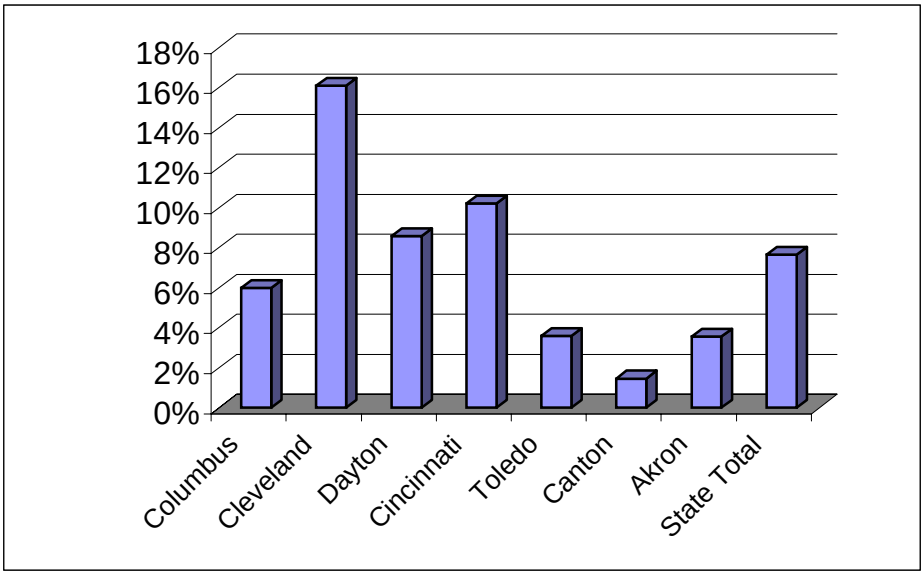
Transit System (Major City)	Service Area	Average Weekday Unlinked Trips by Trolleybus	Percent of Service Population Riding Trolleybus on Weekday
COTA (Columbus)	1,068,978	-	-
GCRTA (Cleveland)	1,393,978	-	-
DMVRTA (Dayton)	559,062	12,435	2%
Metro (Cincinnati)	845,303	-	-
TARTA (Toledo)	455,054	-	-
CRTA (Canton)	378,098	-	-
AMRTA (Akron)	542,899	-	-

Of all modes of mass transit service, which includes bus, trolleybus, light and heavy rail services, Cleveland had the highest percentage of service population riding all modes during a weekday with 16% (Figures 5 and 6). Columbus ranked fourth in the state, behind Cleveland, Cincinnati, and Dayton, with 6%. Again, Canton had the lowest percentage with 1%.

Figure 5: Unlinked Trips and Service Population Related to All Modes

Transit System (Major City)	Service Area	Average Weekday Unlinked Trips by All Modes	Percent of Service Population Riding All Modes on Weekday
COTA (Columbus)	1,068,978	64,152	6%
GCRTA (Cleveland)	1,393,978	224,270	16%
DMVRTA (Dayton)	559,062	47,994	9%
Metro (Cincinnati)	845,303	86,376	10%
TARTA (Toledo)	455,054	16,311	4%
CRTA (Canton)	378,098	5,549	1%
AMRTA (Akron)	542,899	19,342	4%

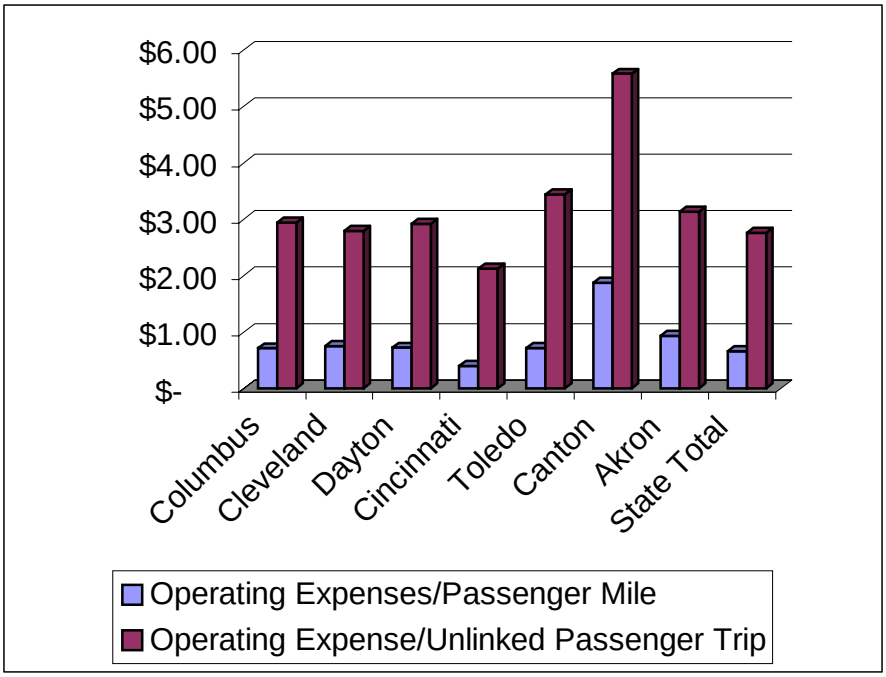
Figure 6: Percent of Service Area Population Riding All Modes on an Average Weekday



BUS SERVICE COST EFFICIENCY

The bus service cost efficiency was also analyzed using 1999 data (Figure 7). Cincinnati had the lowest costs for both operating expenses per passenger mile and operating expenses per unlinked passenger trip with $0.40 and $2.12 respectively. Canton had the highest operating expenses per passenger mile and per unlinked passenger trip with $1.87 and $5.58 respectively. The state's average operating expenses were $0.67 per passenger mile and $2.67 per unlinked passenger trip. Overall, the operating expenses per unlinked passenger trip were greater than the operating expenses per passenger mile.

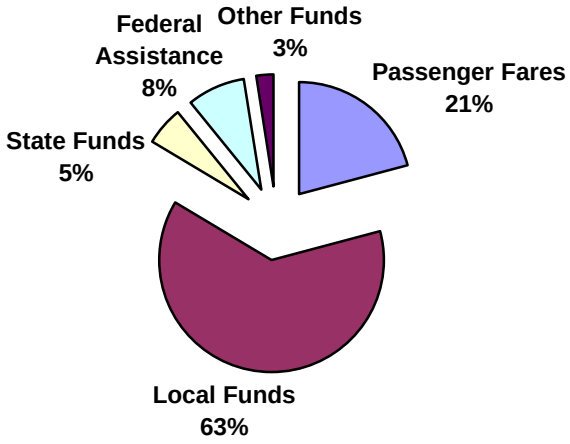
Figure 7: 1999 Bus Service Cost Efficiency



SOURCES OF FUNDS

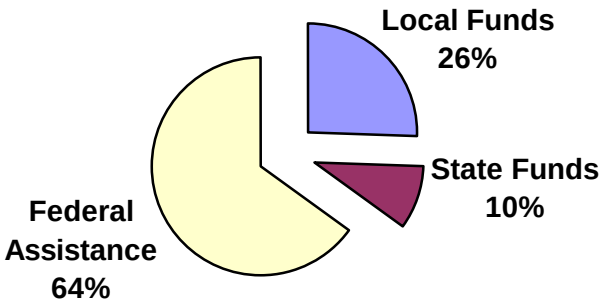
Analyzing the 1999 Ohio mass transit sources of operating funds, the data show that local monies made up the majority of total funds with 63% followed by passenger fares which comprised 21% of the total funds (Figure 8). Besides miscellaneous dollars, or other funds, the state provided the lowest percentage, or 5%, of monetary contributions to operate Ohio mass transit systems.

Figure 8: 1999 Ohio Mass Transit Sources of Operating Funds



Federal assistance dominates capital funding sources for Ohio mass transit making up 64% of the total funds (Figure 9). Local funds comprised 26% of the total funding. The state provided the least amount of funds with only 10%. To put these numbers in perspective, projects under the New Starts program, which funds new transit systems or significant additions to existing ones, only receive 50% federal match, therefore transit project sponsors must receive 50% of the total project costs from local funds. However, highway expansion projects normally receive 80% funding from the federal government while only 20% must come from local funds.

Figure 9: 1999 Ohio Mass Transit Capital Funding Sources



COMPARISON TO PEER CITIES

Peer cities throughout the nation were analyzed to compare state funding for both operation and capital costs (Figure 10). Cities such as Pittsburgh, Indianapolis, Detroit, Charlotte, Baltimore, and Madison receive higher percentages of state funding, ranging from 4% to 59% higher than Ohio's state funding for mass transit operational costs. Four cities, including Pittsburgh, Detroit, Baltimore, and Madison, also had higher percentages of state funding for capital costs. These cities received 10% to 29% more from their states than those analyzed cities in Ohio.

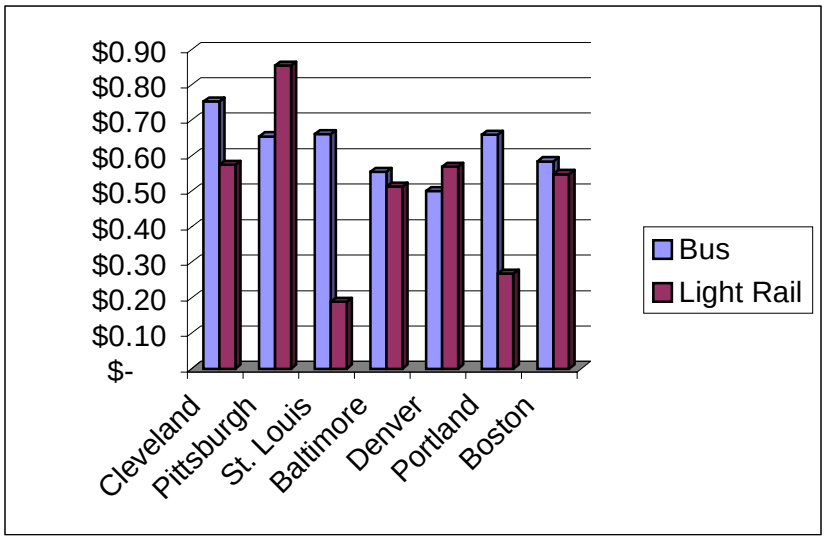
Figure 10: Peer Cities with Higher Percentages of State Funding

City	Operations	Capital
Pittsburgh	56%	30%
Indianapolis	21%	-
Detroit	44%	27%
Charlotte	9%	-
Baltimore	64%	39%
Madison	42%	20%
Ohio Average	5%	10%

Ohio cities were compared to other cities throughout the nation that provide the same mass transit services. Since Cleveland is the only city in Ohio to provide light rail service, the northeastern Ohio

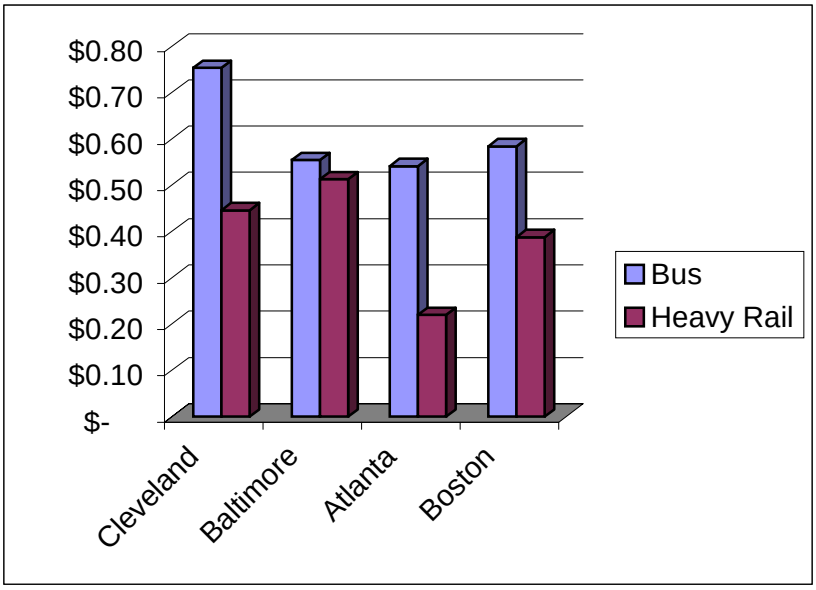
city was compared to Pittsburgh, St. Louis, Baltimore, Denver, Portland, and Boston, all of which provide both bus and light rail systems. The operating costs per passenger mile were analyzed for these two transportation services (Figure 11). Only Pittsburgh and Denver showed to spend more on light rail than bus service. Among those cities analyzed, Cleveland had the highest operating costs per passenger mile for bus service with $0.75 while Denver had the lowest costs with $0.50. Pittsburgh had the highest operating costs per passenger mile for light rail with $0.85 and St. Louis had the lowest cost with $0.19. Overall, the operating costs per passenger mile were less for light rail than they were for bus service.

Figure 11: Operating Costs Per Passenger Mile for Bus and Light Rail Service



The operating costs per passenger mile for bus and heavy rail service in Cleveland were also analyzed and compared to other cities in the United States, including Baltimore, Atlanta, and Boston, that provide the same services (Figure 12). Of all of these cities, the bus operating costs per passenger mile were higher than for those of heavy rail. Of all the selected cities analyzed, Cleveland again had the highest operating costs per passenger mile for bus service with $0.75. The highest costs for heavy rail were found in Baltimore, however the cost was about a quarter lower with $0.51. The lowest operating costs per passenger mile for bus service were in Atlanta with $0.54, still higher than Baltimore's heavy rail costs, and the lowest heavy rail costs were also found in Atlanta with $0.22. Again, this low heavy rail cost is still lower than the lowest bus service costs.

Figure 12: Operating Costs Per Passenger Mile for Bus and Heavy Rail Service



HOUSING DENSITY, POVERTY, AND RIDERSHIP

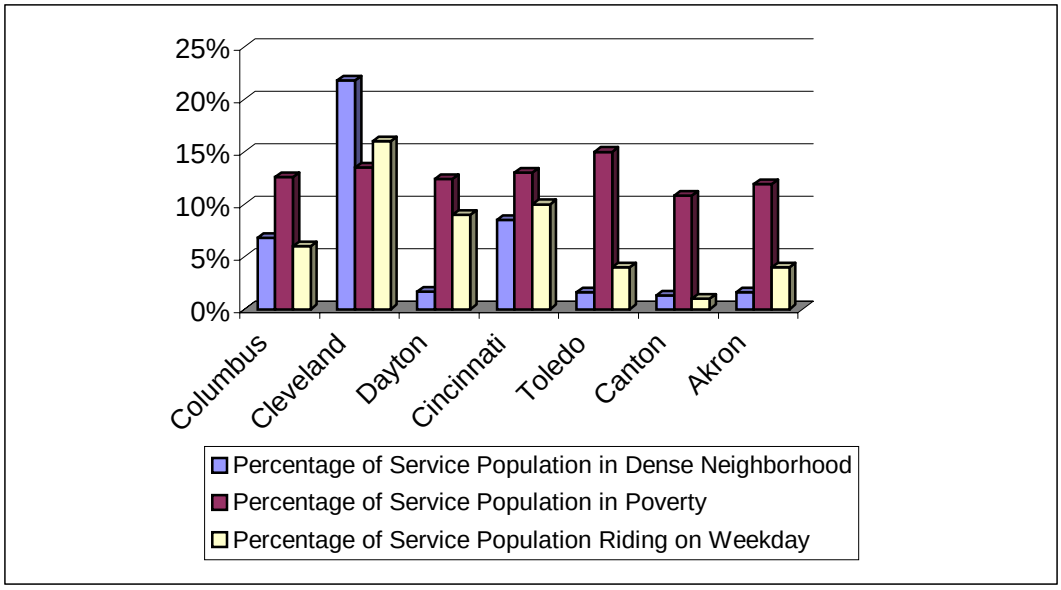
The service population riding mass transit on a weekday was compared to the service population living in a dense neighborhood, those with seven housing units per acre or more (Figure 13 and 14). Through regression analysis, a significant relationship was found between the percentage of people living in dense neighborhoods and the percentage of the service population riding on weekdays. The percentage of people in dense neighborhoods accounts for 66% of the variance. For example, Columbus has 7% of its service population living in dense neighborhoods and only one percent less, or 6%, of their service area riding mass transit on a weekday. Likewise, there is only a one percent difference of Cincinnati's service population living in dense neighborhoods, with 9%, and the service population riding mass transit on a weekday with 10%.

The percentage of the service population living in poverty was also analyzed to determine whether poverty had a direct relation to riding mass transit however no correlation was found.

Figure 13: Service Population in Relation to Dense Neighborhoods, Poverty and Weekday Ridership

Transit System	Percentage of Service Population in Dense Neighborhoods	Percentage of Service Population in Poverty	Percentage of Service Population Riding on Weekday
Columbus	7%	13%	6%
Cleveland	22%	14%	16%
Dayton	2%	12%	9%
Cincinnati	9%	13%	10%
Toledo	2%	15%	4%
Canton	1%	11%	1%
Akron	2%	12%	4%

Figure 14: Percentage of Service Population in Relation to Dense Neighborhoods, Poverty and Weekday Ridership



Conclusions

Light rail and heavy rail tend to be more cost effective to operate than buses. The investment in a light or heavy rail system is not only economically efficient in the long term; it also has fewer impacts on the environment than highways. Two rail tracks have the same holding capacity as 16 lanes of highway.[17] Rail also uses 35% to 40% less energy than cars.[18]

The data also shows that systems with higher ridership rates tend to be more cost effective. As more individuals ride mass transit the service begins to recover capital and operating costs. However, the same is not true for most highways. As more and more cars fill up lanes on Interstate 71 it causes a demand for more capacity. Unlike mass transit, those drivers are not directly paying for a portion of that transportation service.

Many other urban transit systems throughout the nation receive higher percentages of their funds from their state government than Ohio urban transit systems. The state of Ohio only provides 5% and 10% of the total operating and capital funds respectively. Several other cities including Pittsburgh, Detroit, Baltimore, and Madison receive significantly more money from their respective states than those cities in Ohio.

Finally, analysis of the data affirms that there is a direct correlation between high-density neighborhoods and high ridership. Neighborhoods with seven units per acre or more enable a transit authority to provide a viable mass transit system. A dense neighborhood fosters high ridership. Typical suburban neighborhoods that have five units per acre or less will not have a successful mass transit system because there will be less riders. In these types of low density, single-use neighborhoods, residents are completely dependent on their automobiles to commute to all locations, near or far.

[17] Federal Transit Administration, "1996 Report."
[18] Oak Ridge National Laboratory, "Transportation Energy Data Book," edition 16, 1996.

Recommendations

The state of Ohio should increase funding for mass transit in its urban areas. Ohio residents are deprived of a multitude of transportation options. ODOT continues to build new highways and add more lanes, causing Ohioans to rely almost solely on their automobile. Increasing state funding for operating and capital costs of mass transit would provide a better opportunity for multimodalism including light rail, heavy rail, and enhanced bus services.

Cities also need to build neighborhoods that are denser and transit-oriented, to increase ridership. Neighborhoods that are seven units per acre or more enable higher ridership on a mass transit system. Transit-oriented development (TOD) refers to moderate to high density development along a regional transit system. Most TOD programs are focused around rail transit stations, though the concept can be applied to a bus corridor. Ideally, TOD consists of housing and complementary retail, office, and public service development. TOD can reduce mobile source emissions by increasing transit mode share. Dense neighborhoods, like German Village in Columbus, have some of the highest-priced homes in the region yet continue to offer housing choice for people at varying income levels.

Finally, more cities in Ohio need to explore the merits of building light rail and heavy rail systems. Again, transit authorities in Columbus and Cincinnati are currently studying the feasibility of light rail service in their respective communities. Support for both light and heavy rail service in Ohio cities is necessary from public officials and area residents to make these travel modes a reality.