

# Tackling Traffic with Transit: How Albuquerque can Provide Viable Transportation Choices

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# Tackling Traffic with Transit: How Albuquerque Can Provide Viable Transportation Choices

## Executive Summary

### *Albuquerque's transit system does not measure up.*

Analysis of the Transit Profiles of the Federal Transit Administration's National Transit Database shows that Albuquerque's transit system ranks in bottom half among 25 cities its size for ridership and cost and service effectiveness. A closer examination reveals that Albuquerque is lagging far behind its western peers: Corpus Christi, TX; Austin, TX; El Paso, TX; and Tucson, AZ. According to the standard measures of transit system quality Albuquerque ranks:

- 15<sup>th</sup> out of 25 in total annual ridership.
- 15<sup>th</sup> out of 25 in service effectiveness, the amount of passengers traveling per mile.
- 24<sup>th</sup> out of 25 in cost effectiveness, measured as the amount of money spent per mile ridden by passengers.

### *Other cities are implementing practical and effective solutions.*

Other southwestern cities have used innovative technologies and restructured their public transit systems to compete with the personal automobile by changing the system to meet residents' needs and providing faster, more efficient service.

- Tucson contracted a private company to evaluate its bus system and design a comprehensive restructuring plan that will simplify routes and reduce travel time.
- Tucson along with El Paso, Corpus Christi, and San Antonio, are decreasing the amount of time riders have to wait between buses by better coordinating bus transfers.
- Austin has focused on capturing a higher share of the transportation market by restructuring its transit system and in the future offering more viable choices to commuters such as a light rail, commuter rail, and HOV, or High Occupancy Vehicle Lanes, for express bus service.
- Austin, El Paso, San Antonio, and Ft. Worth have taken on a more community approach by offering small neighborhood circulator buses that enable riders to travel short distances from home to grocery stores, schools, or jobs as well as connect to cross town buses at neighborhood terminals.
- San Antonio has also added amenities to increase safety and enjoyment of riding such as security cameras and climate-controlled passenger waiting areas.

### *Albuquerque should take public transit more seriously.*

According to a 1999 Middle Rio Grande Council of Governments survey:

- 94% of Albuquerque area residents use their personal automobile as their primary mode of transportation.

- Only 1.4% use the bus as their predominant mode of transportation.

Albuquerque has traditionally responded to traffic problems by building more roads and adding lanes. Like other cities, however, we are finding out the hard way that an aggressive rate of road construction is not the solution, and actually adds to the problem by attracting more development and traffic. We cannot build our way out of traffic. At this point, residents are spending more time than ever waiting in bumper-to-bumper traffic and away from work and family.

***The public will use transit if it is made efficient and accessible.***

Most residents don't have a viable choice to driving. Commuters don't ride the bus because it is not convenient, doesn't come very often, doesn't reach many areas, and is slow. A morning commute from the Northeast Heights to Downtown Albuquerque could take an hour or more on the bus, twice as long as a drive in a personal car through rush hour traffic.

Recent data shows that many Americans are ready to leave their cars behind and use public transit.

- 80% of Albuquerque residents would use public transit if it resulted in a significant times savings, according to Middle Rio Grande Council of Governments 1999 survey.
- Today between 50% and 60% of commuter trips to Chicago's Central Business District are made on their rail system. 86% of Chicago's transit commuters have an automobile at home but choose to use public transit.
- In 1997, 55% of St. Louis' rail passengers owned two or more cars but chose to ride light rail.
- 50% of Dallas' light rail riders are using public transit for the first time.
- In 1990 in San Diego, a western city developed around the automobile like Albuquerque, 37% of its new trolley system riders previously drove alone to work.
- Ridership on Denver's new Southwest Light Rail Line is at 11,264 per day. As a result, approximately 10,000 fewer cars are clogging Colorado's highways each day.

***Albuquerque elected officials and transportation planners should implement improvements immediately.***

Considering what other cities have done to upgrade their transit systems, we recommend that Albuquerque Mayor Jim Baca and the Albuquerque City Council take the following steps to improve public transit:

1. **Develop a vision for Albuquerque's transit system** that incorporates innovative ways to make public transit competitive with the personal automobile. Options should include:
  - small neighborhood circulator buses and neighborhood transit centers
  - light rail and fixed guided bus ways
  - dedicated bus lanes, signal prioritization, and queue jumping
  - automated vehicle location systems with digital real time bus arrival information signs
2. **Think regionally and include neighboring communities.** Traffic is a regional problem, and intergovernmental agreements can facilitate transit service beyond the city's service area.
3. **Design a comprehensive transit system restructuring plan.** The plan should focus on meeting market demand and improving efficiency. It should be separate from larger transportation plans, such as the Middle Rio Grande Connections, that are tainted by bad sprawling road projects.

4. **Involve the public.** Get public input on what improvements need to be made and what would attract people to use public transit.

# Introduction

The time has come for the City of Albuquerque to take public transit seriously. Every day traffic is getting worse in the Albuquerque metropolitan area. The amount of time drivers lose idling in traffic has increased 850% over the past fifteen years, an increase larger than any other city of comparable size. Every year, each Albuquerque commuter spends on average the equivalent of one 40-hour workweek sitting in traffic and pays \$650 on wasted fuel and the estimated costs of tickets and accidents from drivers attempting to avoid traffic.<sup>1</sup> Traffic will not get any better if we continue to build roads and ignore the opportunities we have to invest in our transit system. In fact, it will only get worse.

**Between 1982 and 1997, the number of roads and highway lanes in Albuquerque grew by 57%, outpacing the region's population growth of 28%. At the same time, driving has increased by 101%.**

Road building encourages more driving. Large cities that have tried to build their way out of congestion, such as Atlanta, Los Angeles, Salt Lake City, and Phoenix, have paid the price in worsened traffic congestion and air pollution. The Utah highway department, for example, is completing an expansion of Interstate 15 through Salt Lake City from 6 lanes to 12 lanes. Already they have realized that these new lanes won't be enough for traffic and are planning to build a new Legacy Highway parallel to I-15.

Between 1982 and 1997, the number of roads and highway lanes in Albuquerque grew by 57%,<sup>2</sup> outpacing the region's population growth of 28%. At the same time, driving in Albuquerque has increased by 101%.<sup>3</sup> Increased congestion from road building, called "generated traffic," is caused by three factors: 1.) drivers taking additional and longer trips to farther destinations made seemingly more reachable by new road capacity; 2.) drivers attracted to the expanded facility in hopes of saving time over previous routes or other modes of travel; 3.) drivers traveling to new development that was made possible by new roads. Nationwide, 50-80% of new highway capacity is occupied by generated traffic.<sup>4,5</sup> Generated traffic precludes road building from being an effective response to congestion.

**Traffic will only get worse if we continue to build roads and ignore the opportunities we have to invest in our transit system.**

Albuquerque's current transportation system also pollutes our air. Currently automobiles produce 60% of Albuquerque's carbon monoxide pollution. Although our carbon monoxide levels have fallen over the past couple of years from the reduction of automobile emissions in newer cars, our dramatic increases in the amount of driving is predicted to raise carbon monoxide pollution over the next 15 years to levels that may exceed federal standards,<sup>6</sup> putting us all at a serious health risk. Increased exposure to carbon monoxide can cause symptoms ranging from visual impairment, a reduced ability to work and learn, difficulty in performing complicated tasks and those requiring manual dexterity, and

<sup>1</sup>Schrank, D.L. and T.J. Lomax, 1999. *The 1999 Annual Mobility Report*. College Station: Texas Transportation Institute (<http://mobility.tamu.edu>).

<sup>2</sup>*An Analysis of the Relationship Between Highway Expansion and Congestion in Metropolitan Areas*. 1998. Washington, D.C.: Surface Transportation Policy Project ([www.transact.org](http://www.transact.org)).

<sup>3</sup>*Why are the Roads so Congested?* 1999. Washington, D.C.: Surface Transportation Policy Project ([www.transact.org](http://www.transact.org)).

<sup>4</sup>Small, K. 1992. *Urban Transportation Economics*. Harwood Academic Pub.

<sup>5</sup>Noland, R. 1999. *Relationship Between Highway Capacity and Induced Vehicle Travel*. Washington, D.C.: U.S. Environmental Protection Agency, Office of Policy.

<sup>6</sup>City of Albuquerque Environmental Health Department.

even death at high levels.<sup>7</sup> We are also at risk from increases in ground level ozone pollution, another automobile emission. Ozone damages lung tissue, worsens respiratory diseases, irritates the eyes, nose, and throat, and limits plant growth.<sup>8</sup>

The solution to Albuquerque's traffic woes is to provide more viable transportation choices. Ninety-four percent of Albuquerque area residents use their personal automobile as their primary mode of transportation. Only 1.4% of Albuquerque residents use the bus as their predominant mode of transportation.<sup>9</sup> A common excuse for Albuquerque's low ridership is that people won't get out of their cars. But that is simply not true.

***Eighty percent of Albuquerque residents would use public transit if it resulted in a significant time savings.***

Commuters avoid the bus because it is not convenient, doesn't come very often, doesn't reach many areas, and is slow. It may take someone who lives in the Northeast Heights or on the West Side an hour or more to commute to work on the bus with one long transfer. When traffic is bad, transfers are often missed because the arriving bus was late to the stop and the departing bus has already left. Waiting for the next bus at the transfer point can add an additional 20 minutes to a commuter's travel time. Even with traffic many commuters find their own personal automobile a much faster, reliable option than the bus.

People will use transit if it is a viable option. This has been proven time and time again in other cities that have diverted considerable amounts of transportation funding away from highways into their transit system and have worked to improve the quality of transit service.

Public transit can work in Albuquerque as well, but the service must be available, of high quality, and competitive for commuting. Eighty percent of Albuquerque residents would use public transit if it resulted in a significant timesavings.<sup>10</sup> Now is the time for Albuquerque to find innovative ways to invest in and improve transit to make it more attractive to commuters.

This report first compares Albuquerque's transit system with sized cities across the country and with four peer western systems: Corpus Christi, Austin, and El Paso, Texas, and Arizona. We examine restructuring efforts underway in cities. Finally we look at efforts across the country to the viability of transit with light rail and innovative bus rapid projects. These comparisons demonstrate that tools are to the Albuquerque metropolitan region to provide a more transportation choice for our residents. If we build more roads, more traffic will come. But if we build a better transit system, people will ride, fewer cars will be congesting our streets, and most importantly, the public will have a faster, more efficient way to travel.

***If we build more roads, more traffic will come. If we build a better transit system, people will ride, fewer cars will be congesting our streets, and most importantly, the public will have a faster, more efficient way to travel.***

25 similar transit Tucson, these improve transit available viable roads, system, and most to travel.

<sup>7</sup>Air Quality Trends-1994: Six Principal Pollutants. 1995. Office of Air and Environmental Protection Agency.

<sup>8</sup>Automobiles and Ozone. Fact Sheet OMS-4. 1993. U.S. Environmental Protection Agency, Office of Mobile Sources. Washington, D.C.

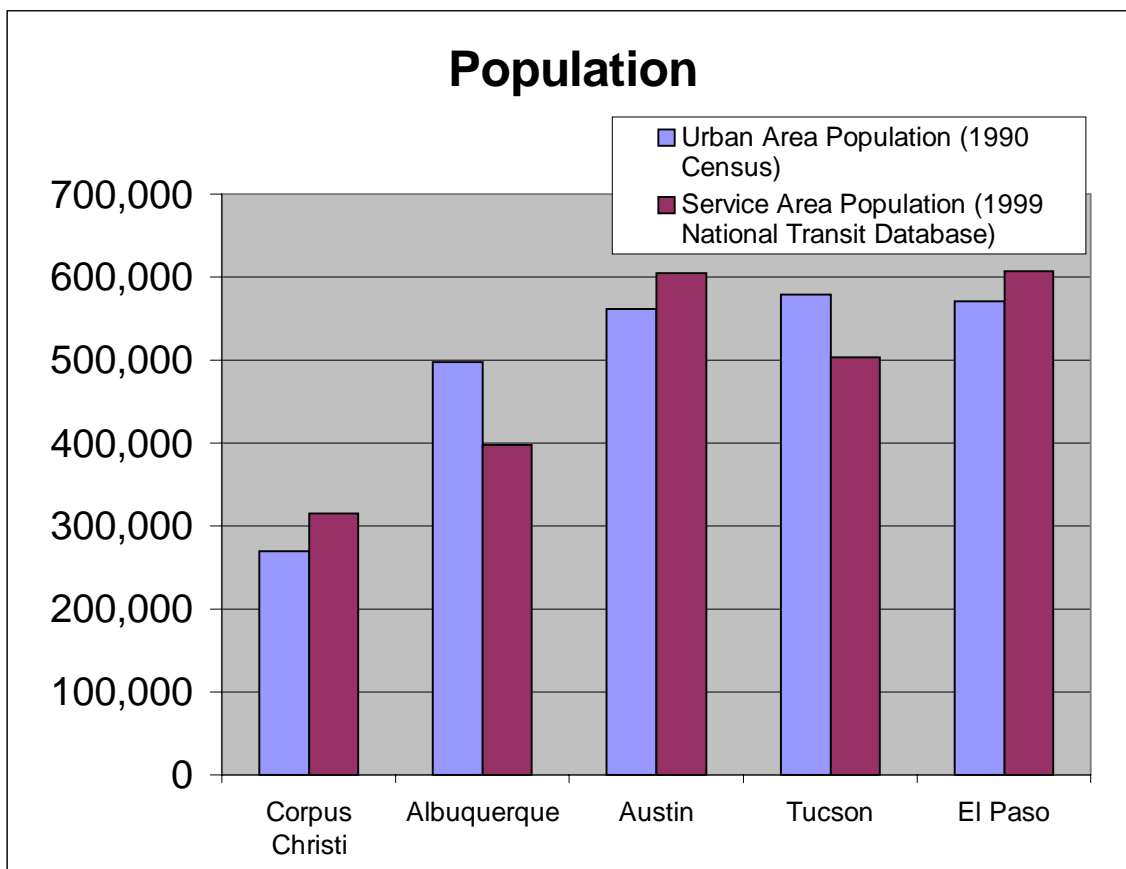
<sup>9</sup>Larson, J. and C. Calvin. 1999. Middle Rio Grande Council of Governments Public Involvement Survey Results for the 2025 Metropolitan Transportation Plan. Albuquerque: Business Information Group, Inc.

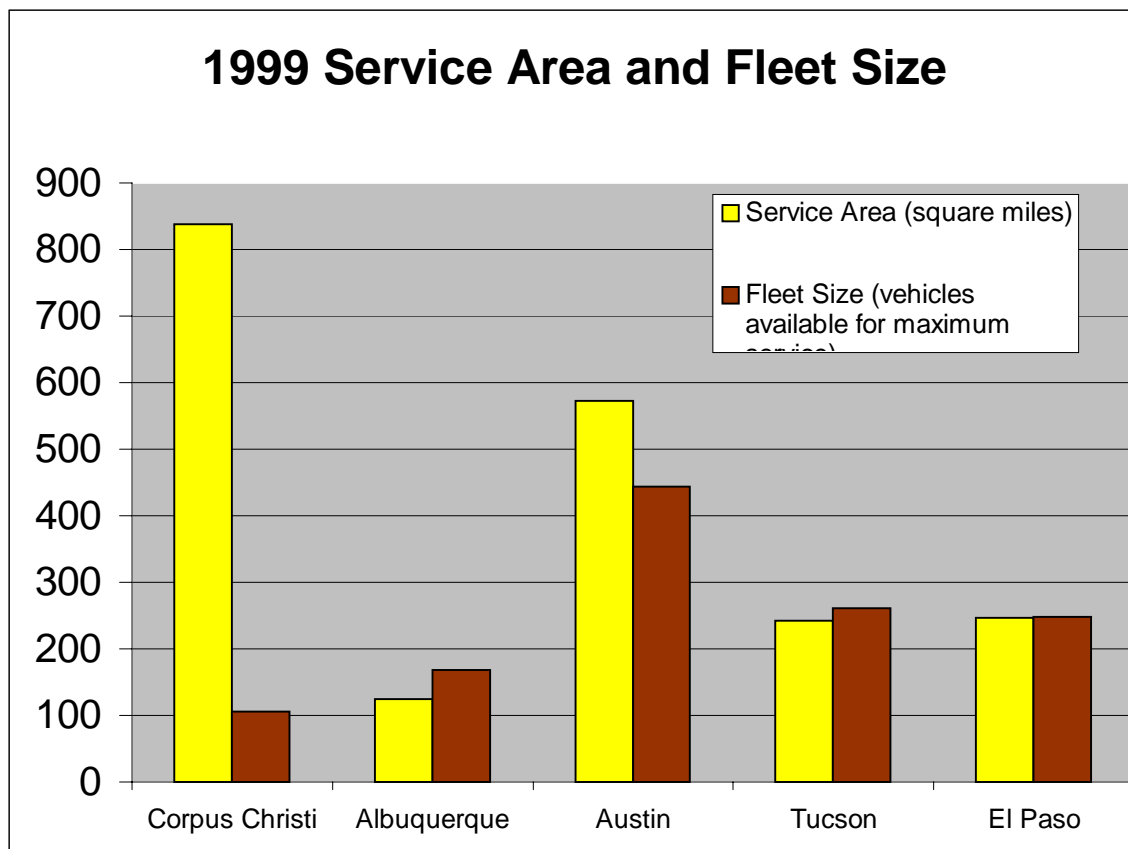
<sup>10</sup> Ibid.

# Comparison of Transit Systems

Albuquerque's transit system is less efficient and effective than most other cities similar in size and those of its western peers. Comparing Albuquerque with cities similar in population size that have recently undergone or are currently undergoing restructuring efforts to increase ridership and improve quality of service, we find that other cities are forging ahead while Albuquerque is falling behind. Corpus Christi, Austin, Tucson, and El Paso are reaping dividends from transit improvements, while comparable improvements have not been made in Albuquerque.

The figure below shows both urban population and service area population for Albuquerque and four southwestern cities similar in size. Appendix A lists the 25 cities used to compare transit systems with their urban and service area populations or the population number directly served by the transit system. The 1990 census population was used because urban area population numbers were not available at the time of printing this report from the 2000 census. The most recent comprehensive data available for comparing transit service and performance is the 1999 Transit Profiles from the Federal Transit Administration's National Transit Database.





Among the 25 similar sized cities Albuquerque has a smaller service area or area in square miles served by the transit system (ranked 22, Appendix B) and fleet size or vehicles available for maximum service (ranked 16,

Appendix C).<sup>11</sup> The figure above shows the differences in service area and fleet size between the five southwestern cities. The transit system in Corpus Christi, TX covers the largest area (838 square miles) with the smallest fleet size (106). Albuquerque, NM has the smallest service area (124 square miles) and a fleet of 168 vehicles. Of all five-transit systems, Austin has the largest fleet size (444 vehicles).<sup>12</sup>

Ridership is important to measure because it suggests the number of trips being made on transit that might otherwise be additional cars on the road adding to traffic congestion and contributing to air pollution. Two statistics used by the Federal Transit Administration (FTA) to measure ridership are: 1.) annual passenger miles (the total number of miles traveled by transit riders in a year) and 2.) annual unlinked trips (the embarking and disembarking of a rider on a vehicle determines one unlinked trip). Therefore if a rider takes two buses (one transfer) to get to work in the morning, this is counted as two unlinked trips. A drawback to this measurement of ridership is that in many cases it double counts for many riders that take two or more buses in their commute. Currently, for most transit systems, this is the only measurement available to measure passenger trips.

When compared to similar sized cities nationwide, using the FTA's 1999 National Transit Database, Albuquerque ranks in the lower half for both measurements, 16 out of 25 for annual passenger miles (20,820,467, Appendix D) and 15 out of 25 for annual unlinked trips (6,544,564, Appendix E).<sup>13</sup>

<sup>11</sup>Federal Transit Administration National Transit Database, Transit Profiles for 1999.

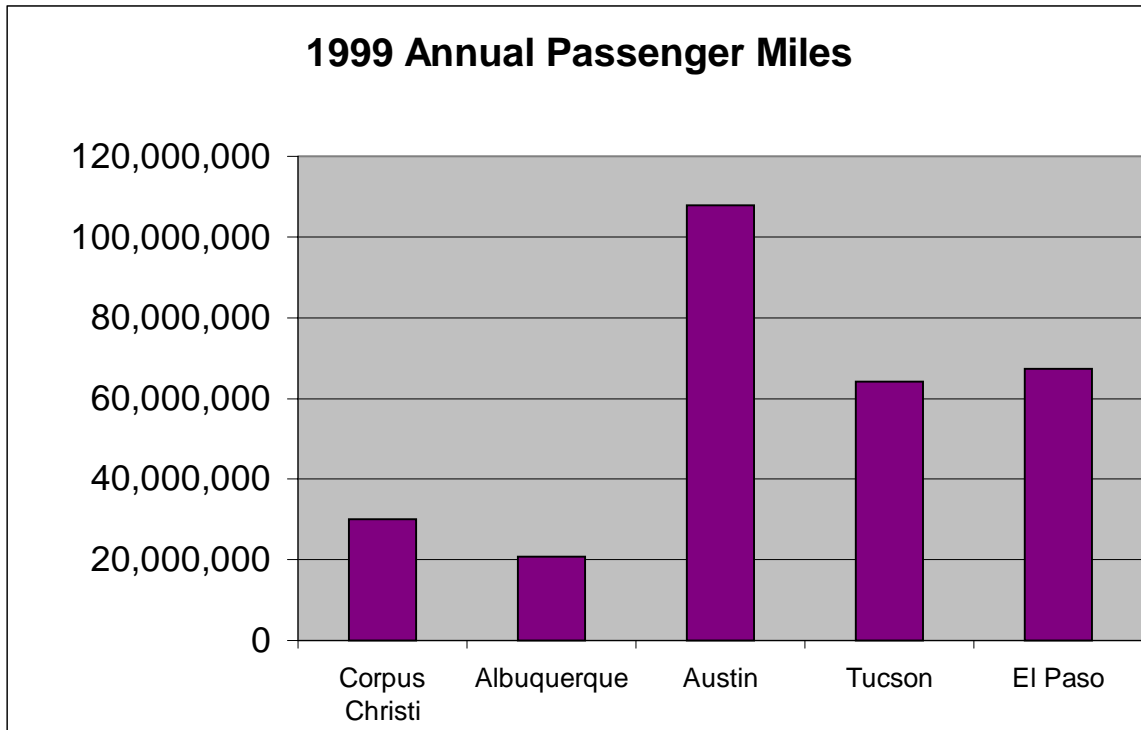
[www.ntdprogram.com/NTD/Profiles.nsf/1999+all/](http://www.ntdprogram.com/NTD/Profiles.nsf/1999+all/)

<sup>12</sup>Ibid.

<sup>13</sup> Ibid.

Western cities performing better than Albuquerque include Tacoma, WA with the highest annual passenger miles among the 25 cities (107,020,200, Appendix D). While Tacoma has almost the same urban population size as Albuquerque (497,210, Appendix A), its higher passenger miles could be explained by its larger service area (450 square miles, Appendix A) and service area population (635,290, Appendix B).<sup>14</sup>

Fresno, CA a city with a very similar urban population (453,388, Appendix A) and service area population to Albuquerque (453,388, Appendix A) has twice as many annual passenger miles as Albuquerque (42,189,695, Appendix D) and almost twice as many annual unlinked trips (11,119,282, Appendix E).<sup>15</sup>



The figure above and on the next page show annual passenger miles and annual unlinked trips for Albuquerque and its four similar sized southwestern peers. Both measurements of

ridership show that Albuquerque has a low ridership in comparison to its southwestern counterparts. Austin is ranked first among the 25 urban areas examined for annual passenger miles while El Paso is ranked fourth and Tucson is ranked sixth (Appendix D).<sup>16</sup> Austin has the highest annual unlinked trips among the 25 cities studied with 36,137,439, that is 6 times more than Albuquerque (Appendix E).<sup>17</sup> It is important to note that since a quarter cent transportation tax was added for road and transit improvements in the spring of 2000, ridership has increased in Albuquerque by 35% (up from last year for August and September). Under this effort, service was expanded by increasing rush hour service on routes serving transit dependent residents in areas with the greatest demand for bus service and on some other commuter routes throughout the city. New evening and Sunday service was also added, along with decreased waiting times between buses.<sup>18</sup> Since the FTA's Transit Profiles are not available for 2000, we do not know how this increase compares with the other transit systems. While the

<sup>14</sup> Ibid.

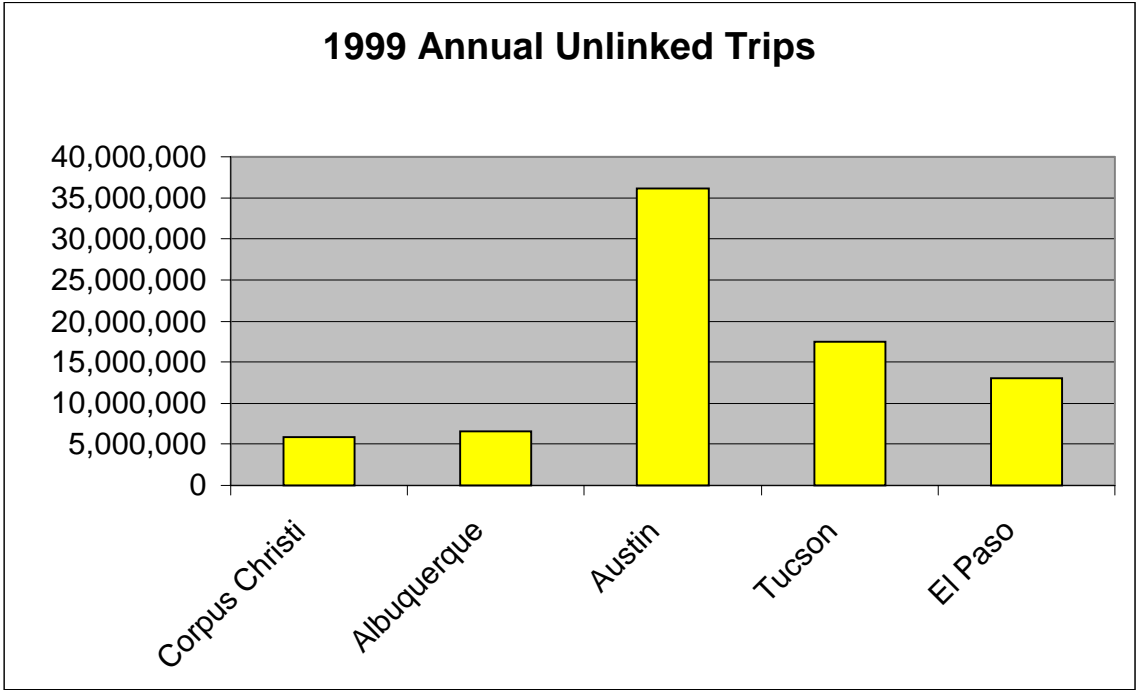
<sup>15</sup> Ibid.

<sup>16</sup> Ibid.

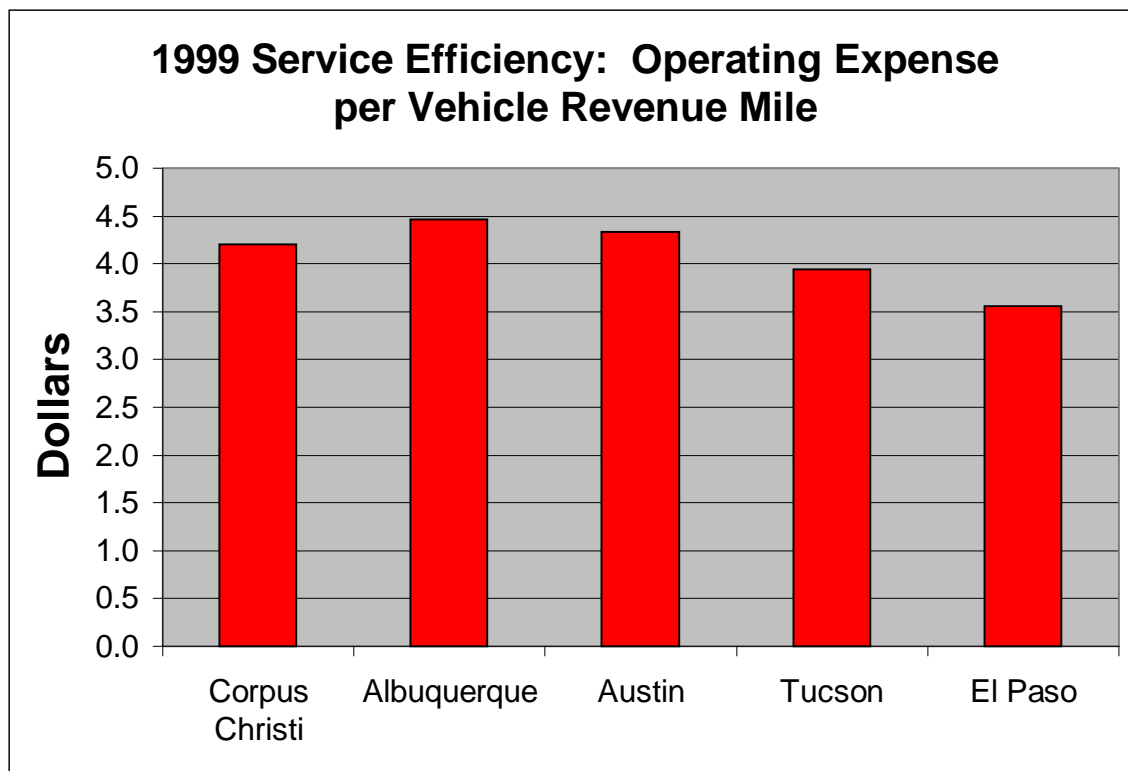
<sup>17</sup> Ibid.

<sup>18</sup>J. Parker. Personal Communication 8/2000. Transit Manager Service Development Division, Sun Tran, City of Albuquerque Transit, Albuquerque, New Mexico.

improvements made with the quarter cent transportation tax are a step in the right direction, our southwestern peers show, as explained in the next chapter, that we could do a lot more to increase ridership.



Along with ridership, the FTA evaluates service efficiency, cost effectiveness, and service effectiveness of each transit system. A measurement of service efficiency is operating expense per vehicle revenue mile or the amount of miles vehicles travel when available for public use. A lower operating expense indicates a more efficient transit service. For 1999, Albuquerque ranks 15 among the 25 cities with \$4.47 per vehicle revenue mile (Appendix F).<sup>19</sup> Oxnard-Ventura, CA urban area ranked number one with \$1.82 per vehicle revenue mile (Appendix F), however they have a comparatively small service area (39 square miles, Appendix B), which may explain for its high efficiency.<sup>20</sup> The figure below shows how the four southwestern cities perform better than Albuquerque with El Paso just under a dollar less per vehicle revenue mile (\$3.56, Appendix F).<sup>21</sup>



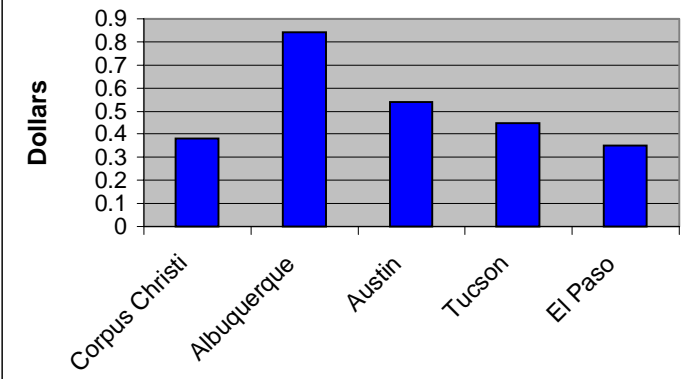
<sup>19</sup>Federal Transit Administration National Transit Database, Transit Profiles for 1999.

[www.ntdprogram.com/NTD/Profiles.nsf/1999+all/](http://www.ntdprogram.com/NTD/Profiles.nsf/1999+all/)

<sup>20</sup> Ibid.

<sup>21</sup> Ibid.

**1999 Cost Effectiveness Measured in Operating Expense per Passenger Mile**

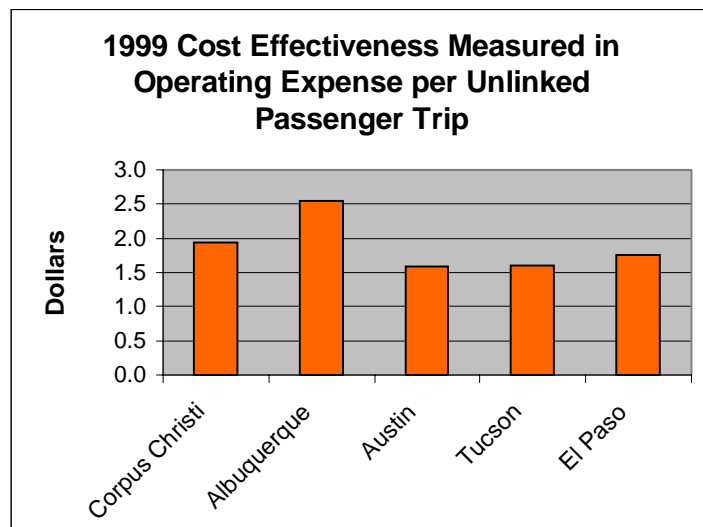


Cost effectiveness is measured in both operating expense per passenger mile and operating expense per unlinked passenger trip. Albuquerque ranks 24<sup>th</sup> among the 25 cities for operating expense per passenger mile with \$0.84. Oxnard-Ventura, CA ranks first with \$0.34 and El Paso, TX ranks second with \$0.35, just under half of Albuquerque's (Appendix G).<sup>22</sup> The figure at the left shows the operating expense for the five southwestern cities. Again, Albuquerque is the worst among these western cities with the highest operating expense per passenger mile. This could be explained by the fact that Albuquerque has

the lowest passenger miles among the group because Albuquerque's operating expenses are lower than Austin, Tucson, and El Paso with \$16 million. Austin has a total operating expenses of \$56 million, Tucson \$27 million, and El Paso \$22 million.<sup>23</sup>

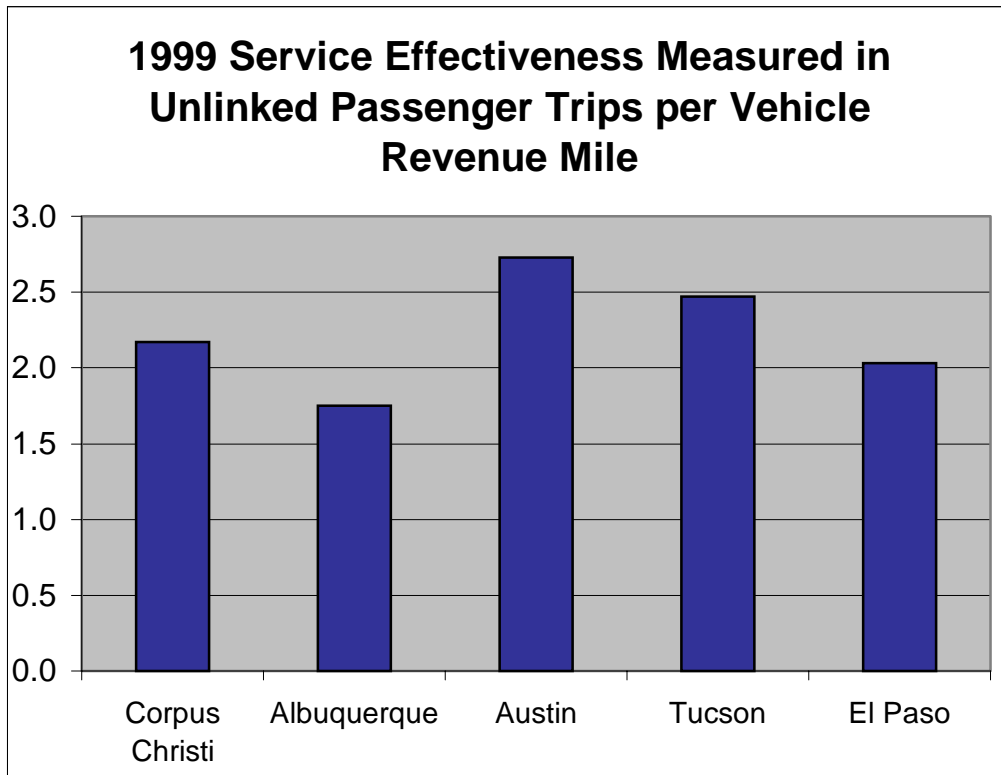
Albuquerque ranks 14<sup>th</sup> for operating expense per unlinked passenger trip with \$2.55 (Appendix H).<sup>24</sup> Springfield, MA is ranked first with \$1.18 (Appendix H).<sup>25</sup> The figure at right shows that again that Albuquerque has the worst cost effectiveness among the five southwest cities. Both Austin and Tucson do well ranked 4<sup>th</sup> and 5<sup>th</sup> respectively among the 25 cities with a little over a dollar less than Albuquerque (\$1.58 and \$1.60 respectively, Appendix H).<sup>25</sup> Again Albuquerque's poor performance can be attributed to its ridership (unlinked passenger trips).

**1999 Cost Effectiveness Measured in Operating Expense per Unlinked Passenger Trip**



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<sup>22</sup> Ibid.  
<sup>23</sup> Ibid.  
<sup>24</sup> Ibid.  
<sup>25</sup> Ibid.  
<sup>25</sup> Ibid.



Finally, service effectiveness is measured in unlinked passenger trips per vehicle revenue mile or the number of passenger trips (ridership) per mile buses are in service. Albuquerque ranks 15<sup>th</sup> at 1.75 trips with New Haven-Meriden, CT ranked first with 3.69 trips (Appendix I)<sup>26</sup> Austin is ranked 5<sup>th</sup> at 2.73 trips (Appendix I).<sup>27</sup> The figure above shows Albuquerque with the lowest service effectiveness among the five southwest cities.

Overall Albuquerque doesn't perform as well as most of its 25 similar sized peers or its 5 southwestern counterparts. Its transit system has a lower ridership, the highest operating expense (both per passenger mile and unlinked trip) and the lowest unlinked passenger trip per vehicle revenue mile among the five southwest urban areas. These results indicate that Albuquerque could improve its transit system greatly, as the surveys of public opinion mentioned earlier indicate. In the next section, we examine what these peer cities are doing to improve the quality of their transit systems.

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<sup>26</sup> Ibid.

<sup>27</sup> Ibid.

# Restructuring Transit to Provide a Viable Choice

## ***Tucson, AZ – Sun Tran***

**Problem:** Like Albuquerque, Tucson's bus system runs on a grid and has continued to grow as the city grew into a complex and inefficient route network. The Sun Tran transit department was finding itself in a \$2.2 million deficit, and there was pressure to start cutting routes in order to reduce the deficit. A major contributor to the system's inefficiency was the lack of coordination between transfers. Many commuters were discouraged because of the lengthy travel times needed to make most transit trips.<sup>28</sup> In 1999 Sun Tran changed management and the mayor and city council made requests to the transit department to make changes in the system that will provide a more efficient service and increase ridership.<sup>29</sup>

**Restructuring Plan:** In 1999 the City of Tucson Department of Transportation (CDOT) contracted Transportation Management & Design, Inc. (TMD) to design a comprehensive Transit System Restructuring Plan. The cost of the planning effort was \$90,000, 80% of which was paid for by federal programs. The evaluation by TMD included an analysis of data previously collected from on-board surveys of riders, number of passenger boardings, and route usage, as well as data collected by TMD on traffic conditions, transit center and bus stop activity, demographic and operating characteristics, route alignments, and potential new route sections. An origin-destination analysis was done using GIS to evaluate scheduling and population densities. A Citizens Transportation Advisory Committee made up of Tucson residents was also consulted for review of new route and schedule proposals. The new plan will focus on simplifying routes so passengers do not have to travel so long to get from one destination to another as well as focusing on transfer centers and increasing the efficiency of transfers.<sup>30</sup>

**Results:** The new plan will be phased in over the next three years.

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<sup>28</sup>Transportation Management & Design. 2000. *Final Report, City of Tucson Transit System Restructuring Plan.*

<sup>29</sup>Ramsey, R. Personal communication, 8/2000. Director of Scheduling and Service Department. Sun Tran. Tucson, Arizona.

<sup>30</sup>Transportation Management & Design. 2000. *Final Report, City of Tucson Transit System Restructuring Plan.*

## ***Austin, TX - Capital Metro Transit Authority***

Problem: The existing transit system is radial with a focus on downtown Austin. This means that most routes meet downtown where riders may have to transfer to catch another bus to get to another part of town. The route network has not kept up with the residential and commercial development outside of the downtown area, and therefore is inefficient for many residents.<sup>32</sup>

Restructuring Plan: Capital Metro is beginning to redesign its bus route system through its five-year service plan. A three-step approach has been recommended to redesign the system: (1) Market research and public input to measure public opinion of current transit operations and future options. This includes surveys, community meetings, internet outreach, focus groups and public forums; (2) Forecasting and modeling of future ridership for different mass transit options; (3) Financial feasibility and cost/benefit analysis.<sup>33</sup> Capital Metro has set goals to achieve a higher quality transportation system and capture a higher share of the transportation market by offering more transportation options, such as light rail, and providing local neighborhoods with the opportunity to determine their own transportation priorities.<sup>34</sup>

Results: The new plan will be phased in over the next five years.

## ***Corpus Christi, TX - Corpus Christi Regional Transit Authority***

Problem: The transit authority started in 1986 and took over the city transit department. The system needed to expand service to a larger area while keeping it efficient and increasing ridership.<sup>35</sup>

Restructuring Plan: Between 1986 and 1991 the fixed route system was expanded by increasing operating hours, the bus fleet, routes, and adding four transit stations or centers. A new data communications system is being developed with area governments to locate vehicles and count passengers automatically. This new system will provide for a more efficient and flexible scheduling of vehicles.<sup>36</sup>

Results: Between 1988 and 1991 ridership increased by 44% as a result of the restructuring.<sup>37</sup>

## ***El Paso, TX - Sun Metro***

Problem: Sun Metro has had a difficult time meeting the needs of the population. The existing bus system is old and failing, with buses frequently breaking down. Commuters in the past had to go downtown to transfer to other routes, making transit inefficient for many residents.<sup>38</sup>

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<sup>32</sup>Capital Metropolitan Transportation Authority – Austin Texas Annual Report on New Starts, [www.capmetro.austin.tx.us/future/NewStarts.htm](http://www.capmetro.austin.tx.us/future/NewStarts.htm).

<sup>33</sup> Ibid.

<sup>34</sup>Rae, K. J. General Manager of Capital Metropolitan Transportation Authority. Fiscal Year 2001 Budget.

<sup>35</sup>Haley, F. Personal communication, 11/2000. Director of Service Development, Corpus Christi Regional Transportation Authority– The B, Corpus Christi, Texas.

<sup>36</sup> Ibid.

<sup>37</sup> Ibid.

<sup>38</sup> Dunavant, P. Personal communication, 8/2000. Sun Metro Authority, El Paso, Texas.

Restructuring Plan: Sun Metro is currently constructing five neighborhood transit terminals that will increase the effectiveness and efficiency of transfers between routes. New neighborhood circulators will feed into these transit terminals, allowing commuters to connect to express and cross town routes.<sup>39</sup>

Results: New neighborhood transit terminals are currently being constructed.

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The following two transit systems in Fort Worth, TX and San Antonio, TX are not part of the comparison analysis in the previous sections because they are larger cities. They are included here because they offer successful and innovative restructuring examples that could be used in smaller cities.

## ***Fort Worth, TX - Fort Worth Transportation Authority, The T***

Problem: Surveys of riders (Appendix J) and the public indicated that the existing radial system was not effective and did not meet customer expectations. The system's drawbacks were duplicative service, time-consuming routes, and a complex and difficult system to navigate for the public. Riders, like those in Albuquerque, wanted a faster and more frequent service. Among non-riders the number one reason they didn't use the "T" was because it took too much time. The public wanted to travel to places that weren't currently served and to have transportation within their neighborhood (to grocery stores, restaurants, doctors, schools). A constant decline in ridership had plagued the "T" for quite some time.<sup>40</sup>

Restructuring Plan: After conducting a survey of riders and non-riders, the planning and scheduling department took the lead on developing a restructuring plan. The plan was implemented in January 1998 and focused on restructuring the transit system from a "radial" to a more community-oriented approach. "Rider Request" buses are smaller and circulate on a small fixed route within a neighborhood. They have designated times for specific stops, but also circulate to pick up riders who call for door-to-door pick up. These neighborhood circulators or "Rider Request" routes feed into five transfer centers where riders can access larger radial, cross-town, and express buses. Radial buses continue to come at short intervals and take riders from the five transfer centers to downtown. Cross-town routes take commuters across town, while interlined routes connect to other transfer stations. Express routes are high frequency and faster to specific destinations such as major employment centers and other transfer centers during peak hours. Most routes will have 15 to 30 minute intervals between buses. A major advantage to this system is that the transfer centers make transferring routes easy, quick and dependable. Using a timed-transfer system, all routes arrive at the transfer center at the same time, eliminating a wait period for riders.<sup>41</sup>

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<sup>39</sup> Ibid.

<sup>40</sup>Fort Worth Transportation Authority Executive Committee Action, Approval of Route Restructuring Plan, 97-50. 8/21/97.

<sup>41</sup> Ibid.

Results: After restructuring, service costs for fiscal year 1998 were down 4% from 1997<sup>42</sup> and ridership has increased in 2000 by 14% since January 1998 with the percentage of commuters taking transit as their primary mode of transportation increasing from 3 to 4% over the same time period.<sup>42</sup>

## ***San Antonio, TX - VIA Metropolitan Transit***

Problem: Between 1991 and 1995 the VIA Metropolitan Transit suffered from a large financial decline primarily from the cost of meeting federal mandates and the lack of fare increases since 1980.

Restructuring Plan: The “Blue Ribbon Financial Committee” was formed in 1995 to review the budget and operation procedures. The committee developed recommendations that enabled the VIA to balance its budget and show a profit. Following this initial step in reform, in 1998 a citizens’ group called the Vision Task Force was formed, with no control by the VIA. The group developed a vision called the Transit 2025 Vision over a six-month period that recommended initiatives and investments to provide a more efficient and rider responsive transit system.<sup>43</sup>

The document presented by the Vision Task Force to the VIA Board of Trustees called for specific goals and recommendations to have in place by 2025. These included: (1) Change the entire bus fleet to 100% clean fuel to reduce emissions; (2) The fleet should be 100% accessible in compliance with the Americans with Disabilities Act; (3) Increase the total fleet by 11% to keep up with population growth; (4) Diversify the fleet with over the road coaches for express park and rides, articulated buses for high demand routes with frequent service, and small “personal” transit vehicles called station cars; (5) Add amenities to increase safety and enjoyment of riding such as closed circuit televisions and silent alarms for security, (6) Change bus routes by extending existing routes and adding new ones as well as adding 24 hour service to employment demand areas; (7) Introduce a fixed guide way system including light rail, commuter rail, and HOV lanes.<sup>44</sup>

A preliminary study will be conducted over 18 months and will include collecting and analyzing data, reviewing standards, selecting fiscally constrained alternatives, and incorporating public and stakeholder participation. From the study, an implementation plan will be developed that will span the next ten years. This plan will provide service improvements that meet market demand. A proposal will be made to change route frequency, running time, alignment, and span of service with the major goal of improving ridership and efficiency of the overall system.<sup>45</sup>

The VIA has already taken some important initial steps in restructuring the transit system including the implementation of different type routes such as circulators, cross-town, and express buses that feed into transit centers. A major focus has been to better coordinate transfers so riders would not have to wait. Improvements were made at three major transfer points in August 1997, June 1998 and August 1998 so that residents riding neighborhood circulators could immediately transfer to a express or limited bus on their morning commutes to work and vice versa in the evenings. Two additional transfer centers are being constructed that will offer climate controlled passenger waiting areas and

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<sup>42</sup> Ibid.

<sup>42</sup> Anderson, D. Personal communication, 8/2000. Director of Planning and Scheduling, Fort Worth Transportation Authority. Forth Worth, Texas.

<sup>43</sup> VIA Metropolitan Transit Comprehensive Service Assessment Scope of Work. August 2000. VIA Metropolitan Transit, San Antonio, Texas.

<sup>44</sup> Frost, D. Personal communication, 8/2000. Manager of Policy, VIA Metropolitan Transit, San Antonio, Texas.

<sup>45</sup> VIA Metropolitan Transportation Authority, Texas Department of Transportation, [www.dot.state.tx.us/insdot/orgchart/ptn/ptninfo/MTA/VIA.htm](http://www.dot.state.tx.us/insdot/orgchart/ptn/ptninfo/MTA/VIA.htm)

customer service centers. Also, in August 1998 monthly pass prices were reduced from \$30 to \$15 to encourage more ridership.<sup>46</sup>

Results: Ridership has increased by 11% over the two-year period from August 1997 to August 1999 after implementing the three timed transfers between various routes and the decrease in monthly pass fees. Other restructuring efforts will occur over a ten-year period after the final study has been completed.<sup>47</sup>

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<sup>46</sup> Ibid.

<sup>47</sup> Looking to the Future of Transportation in San Antonio, VIA website, [www.viainfo.net/2025/index.html](http://www.viainfo.net/2025/index.html)

# Transit Innovations: Light Rail and Rapid Bus Transit

Cities across the country are looking at new innovative ways to improve their transit systems. Many are implementing light rail or rapid bus transit.

## **Light Rail**

Cities such as Chicago, IL, St. Louis, MO, Dallas, TX, San Diego, CA, and Denver, CO have invested in their transit system, either with heavy rail, light rail, or trolleys, and thus have provided a more efficient system for commuters. As a result, they have seen transit ridership go up beyond expectations.

### ***Chicago, IL and St. Louis, MO***

Today between 50% and 60% of commuter trips to Chicago's Central Business District are made on the rail system. Eighty-six percent of Chicago's commuters have an automobile available to them, but choose to use the rail system. St. Louis' new light rail system increased ridership on all public transit in the area by 21%. In 1997, 55% of St. Louis' rail passengers owned two or more cars but chose to ride light rail. Seventy-nine percent of the passengers were new to public transit.<sup>48</sup>

### ***Dallas, TX***

In Dallas, a light rail system has been phased in, with the first segment started in June 1996 and the third segment completed in May 1997. The first stage, a 19.9-mile line, far exceeded its 15,000 passengers per day prediction, with 50% or more of its riders using public transit for the first time. This demonstrates that if a fast, safe, dependable and efficient service is offered, people will get out of their cars and use public transit. Many riders stated that they were attracted to the new light rail service because it offered a stress-free option to the crowded roadways, while others stated they preferred the light rail to buses because rail was fast, safe, and clean. It is extremely dependable with 98% on-time performance. A major impetus to building the light rail system was the realization that building more highways would never relieve traffic problems. An additional benefit has been the area's economic boom. New offices, shops, restaurants, and residential buildings have popped up along the light rail corridors and stations. Recently the largest hotel in Texas has been completed next to one of the stations; which the owners made clear would not have built it if it had not been for the new light rail system. At the West End station, restaurants have seen a swell of business after the new line opened.<sup>49</sup>

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<sup>48</sup>Weyrich, P.M. and W.S. Lind. 1999. *Does Transit Work? A Conservative Reappraisal*. Washington, D.C.: Free Congress Research and Education Foundation ([www.apta.com/info/online/weyrich2new.htm](http://www.apta.com/info/online/weyrich2new.htm)).

<sup>49</sup>Dallas (Texas) – Motorist Commuters Liberated by Light Rail, Fact Sheet No. 72, Light Rail Transit Association – UK Development Group, January 1999. [www.lrta.org/facts72.html](http://www.lrta.org/facts72.html)

### ***San Diego, CA and Denver, CO***

San Diego, a western city developed around cars like Albuquerque, has seen ridership exceed expectations after investing in a trolley system. In 1990 thirty-seven percent of its riders previously drove alone to work. In 1991, four years before predicted, the new blue line was carrying 32,000 passengers a day. In 1998 it was carrying 51,000.<sup>50</sup>

Most recently, Denver added the Southwest Light Rail Line in July 2000. Originally planners had predicted ridership to be 8,400 boardings per day, but again public demand is beyond any predictions, with current ridership at 11,264 per day. As a result of the new light rail line, approximately 10,000 fewer cars are clogging Colorado's highways each day.<sup>51</sup> New light rail lines are reducing traffic and air pollution by taking cars off the roads.

### ***Austin, TX***

Austin, TX, one of the cities examined in this report with a comparable population size to Albuquerque, is seriously examining the possibilities of building a light rail system. The proposed light rail would run along two transit corridors and be operable in 2007. The North/South Central Corridor (Red/Green Line) would connect north Austin with the central business district and extend to the south part of Austin. This corridor would provide an 18-mile service with 21 stations, including direct access to the University of Texas and the State Capitol Complex. The shorter Southeast Corridor (Orange Line) would connect the central business district to the airport. The total capital costs for this initial phase (other lines and extensions may be added later) is estimated at \$919.6 million. Annual ridership is predicted to be 12.7 million in 2007 and 15 million in 2025.<sup>52</sup>

Cost benefit analysis has shown that the proposed light rail will not only increase transit ridership and take cars off the road, but will also provide an economic benefit to the Austin economy from new businesses attracted to the light rail corridor. Over a thirty-year period, total economic benefits will range from \$233.6 million for the Orange Line to \$1.2 billion and \$1.3 billion for the Red and Green Lines respectively.<sup>53</sup>

Light rail would improve door-to-door travel times along adjacent roads, reducing average trips by 9 minutes in the starting year of 2007 and 12 minutes by 2025, thus providing a 16% faster commute. This more efficient mode of transportation would entice some highway users to switch to transit. Planners predict that people who choose to commute by light rail over their own personal cars would save a total of \$34.2 million in 2007 and \$71.5 million in 2025 from vehicle operating and ownership costs. Environmental and safety costs to the economy would be \$6 million for 2007.<sup>54</sup>

The cost benefit study points out that an elderly person who is unable to drive and is dependent on taxi service for 24 medical and social trips a month would save \$2,400 a year. According to the Federal Transit Administration, households located within one mile of a light rail line save on average \$250

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<sup>50</sup>Weyrich, P.M. and W.S. Lind. 1999. *Does Transit Work? A Conservative Reappraisal*. Washington, D.C.: Free Congress Research and Education Foundation ([www.apta.com/info/online/weyrich2new.htm](http://www.apta.com/info/online/weyrich2new.htm)).

<sup>51</sup>Marsela, C. 2001. General Managers Report presented to Regional Transportation District February 2001 Board Meeting.

<sup>52</sup>Capital Metro Transportation Authority – Austin, Texas Annual Report on New Starts. 1999, Austin, Texas.

<sup>53</sup>Light Rail Cost Benefit Analysis, Capital Metro Transportation Authority.  
[www.capmetro.austin.tx.us/future/ftpl/Benefits%20of%20light%20Rail%20For%20Austin.htm#Toc467297019](http://www.capmetro.austin.tx.us/future/ftpl/Benefits%20of%20light%20Rail%20For%20Austin.htm#Toc467297019)

<sup>54</sup>Ibid.

per month, or \$3000 per year, in auto-related costs as compared to auto-dependent areas. For Austin, the annual savings per household runs between \$2,304 and \$3,396, and the annual savings per business runs between \$15,787 and \$24,841 depending on the rail line. These savings have tremendous impacts on the economic vitality of local communities. The study concludes by predicting that the initial phase of the light rail system (two corridors, three rail lines) would provide a \$367 million economic benefit, above and beyond the total cost of building and operating the system.<sup>55</sup> While light rail is typically more expensive than buses, it can carry more passengers in a more efficient manner.<sup>56</sup>

## Bus Rapid Transit

Since light rail is a costly investment for many municipalities, another option in improving transit efficiency and viability is Bus Rapid Transit (BRT). BRT uses several different technologies or combinations of technologies to provide a faster, more reliable bus service. BRT technologies include: (1) buses sharing High Occupancy Vehicle lanes with fewer passenger cars; (2) dedicated bus lanes at grade on existing streets but used solely by buses; (3) a bus way that is only for the use of buses and is separated from roads; (4) a curb-guided bus way in which buses are fitted with small wheels which run along two vertical guide rails or curbs that automate steering. The curb-guided bus way's main advantage is that it reduces the lane width requirement, decreasing the amount of right-of-way required. It also allows for more precise docking at boarding stations, eliminating the need for lifts or ramps. The fixed-wheel position of the buses also reduces the area necessary to be paved – only the wheel tracks – thus providing additional green space between the tracks.<sup>57</sup>

Additional technologies that may accompany any of the above are:

- Signal prioritization – electronic devices that extend the green time on the traffic signal as buses approach and provide priority to buses at traffic signals.
- Queue jumpers that allow buses to enter expressways and HOV lanes before other traffic.
- Automated vehicle location systems connected with electronic information signs at bus stops and transfer centers informing riders of next bus arrival times.
- Electronic fare registering devices and all door boarding to expedite boarding times.

All of these technologies are being used and tested out in different parts of the country in order to increase transit efficiency and ridership without the major capital investment of light rail. Here we present transit systems again similar in size to Albuquerque that are developing bus rapid transit projects. Many of these cities are facing the same congestion problems as Albuquerque, with rapid population growth and skyrocketing vehicle miles traveled (VMT, the total number of miles traveled by automobiles). Goals such as reducing VMT and air pollution are virtually impossible without alternative transportation options like BRT and light rail. Bus systems may continue to deteriorate, with increasing congestion causing longer travel times and higher operating costs.<sup>58</sup>

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<sup>55</sup> Ibid.

<sup>56</sup> A Detailed Look at Light Rail Transit, Fact Sheet No. 73, Light Rail Transit Association-UK Development Group, January 1999. [www.lrtta.org/facts73.html](http://www.lrtta.org/facts73.html)

<sup>57</sup> Lane Transit District Pilot East-West Bus Rapid Transit Corridor Project Fact Sheet, Federal Transit Administration Bus Rapid Transit Demonstration Program, U.S. Department of Transportation. <http://brt.volpe.dot.gov/projects/eugene.html>

<sup>58</sup> Ibid.

### ***Eugene, OR***

The first phase of the project will be a ten-mile east-west corridor from Thurston in east Springfield to west Eugene that includes both exclusive bus lanes on streets and curb-guided bus ways. This will be followed by a second phase connecting downtown Eugene with west Eugene along a four mile corridor. This combination of transportation modes, along with innovative new vehicles that are quiet and clean using alternative fuels, will provide a new image of buses that is more positive like that of rail systems. Priority signaling for buses and real-time passenger information will be key features, providing a more efficient user-friendly system. Smaller buses circulating through neighborhoods will connect to BRT lines.<sup>59</sup> The BRT corridor will provide a 10-minute service frequency during weekdays and a 20-minute frequency during evenings and weekends. At implementation in 2001, travel times are expected to decrease by 20%. By 2015 they will decrease by more than 40%, from 27 minutes to 16 minutes between Springfield and Eugene.<sup>60</sup>

### ***Hartford, CT***

The Hartford-New Britain Bus way consists of a two-way, nine-mile exclusive bus way separated from existing roads, with twelve on-line stations connecting downtown New Britain with Hartford's Union Station. Express bus service is planned to continue beyond the bus way on Interstate 84. Buses are able to enter and exit the bus way along the corridor. Signal priority, automatic vehicle location, real time information and expedient transfers from other routes to the corridor will increase efficiency and decrease travel times. There is also an effort to encourage joint development at transit stations along the corridor with residential and commercial developments. The service is expected to be up and running in 2003, with total project costs estimated at \$82 million. Average travel time from Hartford to New Britain is predicted to decrease from 35 to 25 minutes.<sup>61</sup>

### ***Louisville, KY***

In Louisville, KY a BRT proposal is being considered that would provide a rapid transit service on both its own right of way bus way (separate from roads) and on dedicated exclusive street lanes in the downtown area. It would connect Downtown Louisville, the Medical Center Complex, several neighborhoods, the University of Louisville, Louisville Stadium, the fair and exposition center and the airport.<sup>62</sup> The time between buses of the BRT would be 5 minutes between the University of Louisville and Louisville Stadium to downtown and 10 minutes south of the stadium. With exclusive right-of-way and priority signaling, the BRT system would be competitive with the personal vehicle by reducing transit time by more than half as cars are expected to encounter more stalled traffic on I-65.<sup>63</sup>

### ***Charlotte, NC***

Currently an express bus route is using a 2.6-mile two-way lane separated from traffic in the median of Independence Boulevard (US 74). After construction is completed on the freeway (the North Carolina DOT is converting US 74 from a six-lane arterial to an eight-lane freeway), what is now a bus only lane will be opened up and used as an HOV lane. Now and after completion of the project, express buses have a queue jumper at the eastern end of the corridor that permits them to bypass heavy congestion on the freeway. Currently the queue jumper saves 10 to 15 minutes during the evening

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<sup>59</sup>Pilot East-West Corridor BRT, Lane Transit District, Eugene, OR. <http://brt.volpe.dot.gov/projects/eugene.html>

<sup>60</sup>Lane Transit District Pilot East-West Bus Rapid Transit Corridor Project Fact Sheet, Federal Transit Administration Bus Rapid Transit Demonstration Program, U.S. Department of Transportation. <http://brt.volpe.dot.gov/projects/eugene.html>

<sup>61</sup>Hartford-New Britain Busway, Hartford, CT. <http://brt.volpe.dot.gov/projects/hartford.htm>

<sup>62</sup>Transportation Tomorrow, Louisville, KY. <http://brt.volpe.dot.gov/projects/louisville.html>

<sup>63</sup>Transit Authority of River City T<sup>2</sup>: the South Central Corridor, Federal Transit Administration Bus Rapid Transit Demonstration Program. <http://brt.volpe.dot.gov/projects/louisville.htm>

peak and the express lanes save 2 to 4 minutes during the morning or evening peaks.<sup>64</sup> The express lanes are planned to be extended to a total length of 13.4 miles, with up to 22 stations and a total timesavings of 14 minutes.<sup>65</sup> Ridership on the express route has increased 55% over a one-year period since it opened (10,138 in January 1999 to 15,687 in January 2000).<sup>66</sup>

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<sup>64</sup>Independence Corridor BRT, Charlotte, NC. <http://brt.volpe.dot.gov/projects/charlotte.html>

<sup>65</sup>City of Charlotte Department of Transportation Independence Corridor Bus Rapid Transit, Federal Transit Administration Bus Rapid Transit Demonstration Program. <http://brt.volpe.dot.gov/projects/charlotte.html>

<sup>66</sup>Independence Corridor BRT, Charlotte, NC. <http://brt.volpe.dot.gov/projects/charlotte.html>

# Recommendations:

Corpus Christi, Austin, Tucson, and El Paso have done it. Fort Worth and San Antonio have done it. They all have taken major steps to improve their transit system through restructuring and providing better service to their residents. Other cities like St. Louis, Denver, San Diego and Eugene have taken innovative steps to revitalize their public transit with light rail, trolleys and guided bus ways. Even Albuquerque's smoggy neighbor to the west, Phoenix overcame its anti-tax attitude last march and approved a sales tax increase that would create a several billion dollar fund for public transit including a trolley line.<sup>68</sup>

*Now it is Albuquerque's turn.*

Public transit is no longer solely a mode of transportation for those without cars. Albuquerque's sister cities have shown that through restructuring and innovative technologies public transit can provide a viable option for all of us.

*We are at a crossroads.*

We can continue to sprawl out away from our existing neighborhoods and communities with new roads to the middle of nowhere costing millions in tax dollars, or we can invest and restructure our public transit system so that it will provide a fast and efficient mode of travel for all of us. We can either build more roads and lanes and perpetuate our traffic and pollution problems by attracting more automobiles and development or develop a public transit system that integrates with other modes of travel such as walking and biking and gets people out of traffic. More traffic or more choices. The problems of increased traffic congestion or a better, more livable and unique Albuquerque.

*The choice is up to our elected officials and us.*

According to the most recent Federal Transportation Administration data, Albuquerque did not fare too well among cities similar in size and its western peers. The recent quarter cent tax helped expand transit service, and ridership has increased as a result. However, the other cities we examined in this report show that we can do a lot more to provide real transportation choices to the public. Transit must be attractive, comfortable and fast. It must compete with the personal automobile in price and convenience for the public to consider it as a viable option.

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<sup>68</sup>Nolan, M. 2000. Mass transit scores high win in Valley of Smog. The Albuquerque Tribune Insight & Opinion, April 8, 2000.

NMPIRG Education Fund recommends that Albuquerque Mayor Jim Baca and the Albuquerque City Council take the following steps to improve public transit:

**1. Develop a vision for Albuquerque's transit system.**

What type of transit service do we want to have five years from now? Twenty years from now? Fifty years from now? As the four other western cities examined their transit systems, the problem they found was not much different from ours: a system that has not kept up with the transportation needs of the community or the available technological advances. One might argue that Albuquerque's transit system works well to serve those who have no other choice, but if we are serious about addressing our traffic and air pollution problems as well as protecting the livability of our communities through revitalization and redevelopment we must look beyond the type of transit service that is provided now.

Albuquerque's mayor, city council, neighboring communities like Rio Rancho, Corrales, Bernalillo, Belen, Los Lunas and Village of Los Ranchos de Albuquerque, and most importantly the public, must all become partners in developing that vision. As seen with San Antonio's Transit 2025 Vision, a task force, surveys, focus groups and community meetings provide excellent forums to develop such a vision.

Part of the new vision for transit, the restructuring plan, should seriously consider moving away from a grid system to a more community-oriented system with transit centers, as has been the new effective approach in Austin, Corpus Christi, El Paso, Fort Worth and San Antonio. Small comfortable neighborhood circulator vehicles that provide dependable door-to-door service from home to the nearby grocery store, coffee shop, school, clinic or restaurant are very appealing to many communities. These circulator vehicles would then feed into neighborhood transit centers that provide immediate (no waiting) transfers to express buses to employment centers and commercial centers or cross town buses to other neighborhood transit centers. The Albuquerque Transit Department has 30 new small buses on order to arrive soon but there is no plan to put them on new neighborhood circulator routes. While the department has run a trial neighborhood circulator, a market analysis could help determine where best to put these smaller buses.

The transit innovations and technologies occurring in other cities across the country also should be seriously considered and pursued. These include light rail and fixed guided bus ways on major transit corridors, signal prioritization, queue jumping, and automated vehicle location systems with digital real time bus arrival information signs.

**2. Think regionally and include neighboring communities.**

Traffic problems affect Albuquerque's neighbors as well as the city itself. Many residents in the Middle Rio Grande region have no other choice than to drive their own personal car on congested streets. Tucson has addressed this issue by agreeing to an Intergovernmental Agreement with the neighboring Oro Valley (see Appendix K). Tucson Sun Tran provides the service to Oro Valley, which then contributes to the operational and capital costs. While a Regional Transit Authority has been proposed for the metropolitan area, a more regional cooperation is required to make such a regional system work. The first step in that cooperation, as shown by our Tucson neighbors, is to develop an agreed upon Intergovernmental Agreement between Albuquerque and its neighbors.

- 3. Design a comprehensive transit system restructuring plan.** With only 1.4% of Albuquerque area residents using the bus as their predominant mode of transportation, Albuquerque needs to accept the fact that the current system is not providing a viable choice to most of the public. Not only do we need to define the problems and challenges faced by our transit system, we need to develop a comprehensive plan to provide real applicable solutions. Like Tucson, a professional transit firm should be hired to conduct an extensive evaluation and to design a restructuring plan. A complete analysis of routes, origin-destination data of commuters, scheduling and population densities, as well as forecasting and modeling of new transit options are needed. The day and a half evaluation conducted in November 2000 by Public Technology, Inc., an information technology organization, is a very small step. A much larger evaluation and planning effort over a longer period of time is needed in order to restructure our transit system so that it is a viable option for commuters. The primary goal of the restructuring plan, as in all of the cities listed above, should be to capture more of the transportation market. How do we make the Albuquerque transit system more efficient and accessible so commuters will choose it over their own personal automobiles?

Efforts such as the Middle Rio Grande Connections by the City of Albuquerque Transit Department, the New Mexico Highway and Transportation Department and the Middle Rio Grande Council of Governments have provided some initial steps to developing a transit plan. Unfortunately, it is tainted by road projects that will not alleviate our traffic, but create more with sprawling development. The city should pull the transit system out of the Connections plan. The only way for Albuquerque's transit system to offer the highest quality service is for policies to come directly from the City in partnership with the public and neighboring communities. For too long our public money has overwhelmingly gone to road building that has contributed to today's traffic and air pollution problems. A plan including roads will only dilute the money and planning efforts going to transit. A transit plan for the future must stand on its own.

- 4. Involve the public.** The success of many of these restructuring efforts came from asking the public first what they liked and didn't like about their transit system, why they did or didn't ride it, and what they would like to see changed or added that would make it appealing for them to ride. Tucson, Austin, Fort Worth and San Antonio all heavily involved the public in their evaluating and restructuring efforts through such methods as on-board surveys of riders, surveys of non-riders, community meetings, internet interaction sites, focus groups, public forums and public task forces. These tools can be used by Albuquerque to assess not only public opinion of the current system and where the greatest needs are, but also public appeal to different approaches and technologies, potential ridership and what would attract people to ride. When the public has a real opportunity to help determine what kind of transit system Albuquerque will have, they will be more willing to invest in it, support it and use it.

# Appendix A - Urban Area and Service Area Population

Urban Area (alphabetical order)	Urban Population (1990 Census)	Service Area Population (1999 National Transit Database)
Akron, OH	527,863	142,585
Albany, NY	509,106	678,394
<b>Albuquerque, NM</b>	<b>497,120</b>	<b>398,000</b>
Allentown-Bethlehem-Easton, PA-NJ	410,436	389,000
Austin, TX	562,008	604,621
Bridgeport-Milford, CT	413,863	282,710
Charlotte, NC	455,597	546,500
Dayton, OH	613,467	573,809
El Paso, TX	571,017	617,215
Fresno, CA	453,388	453,388
Grand Rapids, MI	436,336	417,217
Hartford-Middletown, CT	546,198	1,075,000
Nashville, TN	573,294	573,294
New Haven-Meriden, CT	451,486	683,160
Omaha, NE	544,292	484,875
Oxnard-Ventura, CA	480,482	108,000
Richmond, VA	589,980	589,980
Rochester, NY	619,653	716,072
Sarasota-Bradenton, FL	444,385	272,000
Springfield, MA	532,747	551,543
Tacoma, WA	497,210	635,290
Toledo, OH	489,155	417,624
Tucson, AZ	579,235	503,991
Tulsa, OK	474,668	367,302
Wilmington, DE	449,616	450,557

# Appendix B - Service Area

Rank	Urban Area	Service Area (square miles, 1999 National Transit Database)
1	Albany, NY	1,760
2	Hartford-Middletown, CT	936
3	Rochester, NY	659
4	Austin, TX	572
5	Akron, OH	492
6	Nashville, TN	484
7	New Haven-Meriden, CT	456
8	Tacoma, WA	450
9	Richmond, VA	374
10	Springfield, MA	302
11	Dayton, OH	274
12	El Paso, TX	247
13	Charlotte, NC	242
14	Tucson, AZ	242
15	Wilmington, DE	213
16	Grand Rapids, MI	185
17	Tulsa, OK	184
18	Omaha, NE	175
19	Sarasota-Bradenton, FL	159
20	Toledo, OH	149
21	Fresno, CA	133
22	<b>Albuquerque, NM</b>	<b>124</b>
23	Allentown-Bethlehem-Easton, PA-NJ	106
24	Bridgeport-Milford, CT	90
25	Oxnard-Ventura, CA	39

# Appendix C – Fleet Size

Rank	Urban Area	Fleet Size (vehicles available for maximum service, 1999 National Transit Database)
1	Tacoma, WA	600
2	Austin, TX	444
3	Wilmington, DE	327
4	Dayton, OH	303
5	Charlotte, NC	292
6	Rochester, NY	279
7	Tucson, AZ	261
8	Albany, NY	250
9	El Paso, TX	248
10	Richmond, VA	244
11	Hartford-Middletown, CT	223
12	Allentown-Bethlehem-Easton, PA-NJ	202
13	Tulsa, OK	197
14	Toledo, OH	193
15	Nashville, TN	176
16	<b>Albuquerque, NM</b>	<b>168</b>
17	Grand Rapids, MI	165
18	Omaha, NE	165
19	Fresno, CA	131
20	Springfield, MA	125
21	New Haven-Meriden, CT	122
22	Sarasota-Bradenton, FL	75
23	Bridgeport-Milford, CT	75
24	Akron, OH	21
25	Oxnard-Ventura, CA	20

# Appendix D – 1999 Annual Passenger Miles

Rank	Urban Area	Annual Passenger Miles (1999 National Transit Database)
1	Austin, TX	107,760,424
2	Tacoma, WA	107,020,200
3	Charlotte, NC	71,027,800
4	El Paso, TX	67,344,201
5	Hartford-Middletown, CT	64,524,733
6	Tucson, AZ	64,056,143
7	Dayton, OH	52,361,739
8	Albany, NY	47,490,913
9	Rochester, NY	42,976,778
10	Fresno, CA	42,189,695
11	New Haven-Meriden, CT	40,947,000
12	Richmond, VA	39,971,384
13	Wilmington, DE	39,674,269
14	Nashville, TN	30,635,711
15	Toledo, OH	22,299,297
16	<b>Albuquerque, NM</b>	<b>20,820,467</b>
17	Omaha, NE	18,687,982
18	Tulsa, OK	18,485,057
19	Allentown-Bethlehem-Easton, PA-NJ	17,917,355
20	Grand Rapids, MI	16,226,935
21	Bridgeport-Milford, CT	10,692,752
22	Sarasota-Bradenton, FL	9,674,998
23	Springfield, MA	8,268,162
24	Oxnard-Ventura, CA	3,788,672
25	Akron, OH	985,100

# Appendix E – 1999 Annual Unlinked Trips

Rank	Urban Area	Annual Unlinked Trips (1999 National Transit Database)
1	Austin, TX	36,137,439
2	Tucson, AZ	17,528,057
3	Hartford-Middletown, CT	17,472,822
4	Dayton, OH	14,604,303
5	Tacoma, WA	14,458,029
6	Richmond, VA	13,485,043
7	Charlotte, NC	13,255,212
8	Rochester, NY	13,148,602
9	El Paso, TX	13,056,143
10	New Haven-Meriden, CT	11,893,320
11	Albany, NY	11,274,073
12	Fresno, CA	11,119,282
13	Wilmington, DE	8,043,164
14	Nashville, TN	7,005,617
15	<b>Albuquerque, NM</b>	<b>6,544,564</b>
16	Bridgeport-Milford, CT	5,096,750
17	Omaha, NE	4,927,994
18	Toledo, OH	4,603,137
19	Grand Rapids, MI	4,272,061
20	Allentown-Bethlehem-Easton, PA-NJ	4,038,573
21	Tulsa, OK	3,231,596
22	Springfield, MA	2,564,534
23	Sarasota-Bradenton, FL	1,668,070
24	Oxnard-Ventura, CA	333,603
25	Akron, OH	132,533

# Appendix F - 1999 Service Efficiency

Rank	Urban Area	Operating Expense per Vehicle Revenue Mile (1999 National Transit Database)
1	Oxnard-Ventura, CA	1.82
2	Akron, OH	2.32
3	Sarasota-Bradenton, FL	2.96
4	Springfield, MA	3.00
5	Omaha, NE	3.53
6	Tulsa, OK	3.56
7	El Paso, TX	3.56
8	Tucson, AZ	3.94
9	Grand Rapids, MI	4.13
10	Wilmington, DE	4.21
11	Austin, TX	4.33
12	Charlotte, NC	4.38
13	Allentown-Bethlehem-Easton, PA-NJ	4.38
14	Toledo, OH	4.47
15	<b>Albuquerque, NM</b>	<b>4.47</b>
16	Bridgeport-Milford, CT	4.60
17	Tacoma, WA	4.74
18	Dayton, OH	4.75
19	Albany, NY	4.84
20	Richmond, VA	4.89
21	Nashville, TN	5.10
22	Hartford-Middletown, CT	5.31
23	Fresno, CA	5.64
24	Rochester, NY	5.72
25	New Haven-Meriden, CT	5.83

# Appendix G - 1999 Cost Effectiveness: Operating Expense per Passenger Mile

Rank	Urban Area	Operating Expense per Passenger Mile (1999 National Transit Database)
1	Oxnard-Ventura, CA	0.34
2	El Paso, TX	0.35
3	Charlotte, NC	0.44
4	Fresno, CA	0.45
5	Tucson, AZ	0.45
6	New Haven-Meriden, CT	0.46
7	Springfield, MA	0.47
8	Tacoma, WA	0.48
9	Sarasota-Bradenton, FL	0.48
10	Hartford-Middletown, CT	0.50
11	Austin, TX	0.54
12	Albany, NY	0.59
13	Richmond, VA	0.61
14	Tulsa, OK	0.62
15	Allentown-Bethlehem-Easton, PA-NJ	0.62
16	Wilmington, DE	0.63
17	Nashville, TN	0.71
18	Omaha, NE	0.72
19	Toledo, OH	0.72
20	Dayton, OH	0.73
21	Akron, OH	0.73
22	Rochester, NY	0.75
23	Grand Rapids, MI	0.79
24	<b>Albuquerque, NM</b>	<b>0.84</b>
25	Bridgeport-Milford, CT	0.86

# Appendix H - 1999 Cost Effectiveness: Operating Expense per Unlinked Passenger Trip

Rank	Urban Area	Operating Expense per Unlinked Passenger Trip (1999 National Transit Database)
1	Springfield, MA	1.18
2	Richmond, VA	1.58
3	New Haven-Meriden, CT	1.58
4	Austin, TX	1.58
5	Tucson, AZ	1.60
6	Fresno, CA	1.68
7	Bridgeport-Milford, CT	1.75
8	El Paso, TX	1.75
9	Hartford-Middletown, CT	1.86
10	Charlotte, NC	2.00
11	Rochester, NY	2.36
12	Albany, NY	2.44
13	Allentown-Bethlehem-Easton, PA-NJ	2.50
14	<b>Albuquerque, NM</b>	<b>2.55</b>
15	Grand Rapids, MI	2.65
16	Omaha, NE	2.70
17	Sarasota-Bradenton, FL	2.78
18	Nashville, TN	2.88
19	Wilmington, DE	2.90
20	Dayton, OH	2.92
21	Tacoma, WA	3.07
22	Tulsa, OK	3.37
23	Toledo, OH	3.44
24	Akron, OH	4.79
25	Oxnard-Ventura, CA	4.87

# Appendix I - 1999 Service Effectiveness

Rank	Urban Area	Unlinked Passenger Trips per Vehicle Revenue Mile (1999 National Transit Database)
1	New Haven-Meriden, CT	3.69
2	Fresno, CA	3.36
3	Richmond, VA	3.10
4	Hartford-Middletown, CT	2.85
5	Austin, TX	2.73
6	Bridgeport-Milford, CT	2.63
7	Springfield, MA	2.53
8	Tucson, AZ	2.47
9	Rochester, NY	2.42
10	Charlotte, NC	2.19
11	El Paso, TX	2.03
12	Albany, NY	1.99
13	Nashville, TN	1.77
14	Allentown-Bethlehem-Easton, PA-NJ	1.75
15	<b>Albuquerque, NM</b>	<b>1.75</b>
16	Dayton, OH	1.63
17	Grand Rapids, MI	1.56
18	Tacoma, WA	1.55
19	Wilmington, DE	1.45
20	Omaha, NE	1.31
21	Toledo, OH	1.30
22	Sarasota-Bradenton, FL	1.07
23	Tulsa, OK	1.06
24	Akron, OH	0.48
25	Oxnard-Ventura, CA	0.37

Appendix J – Rider Survey-Fort  
Worth, TX

Appendix K - Intergovernmental  
Agreement between Tucson and  
Oro Valley

# Appendix L- Transit System Profiles (1999 National Transit Database)

# Albuquerque, New Mexico

## *Sun Tran*

1990 Census Urbanized Area Population: 497,120

1999 Service Area's Population Estimate: 398,000

1999 Service Area: 124 square miles

### 1999 Ridership:

*Annual Passenger Miles:* 20,820,467      *Annual Unlinked Trips:* 6,544,564

Hours of Operation: Monday – Saturday: 6:00AM – 10:00PM, Sunday: 7:00AM – 6:00PM<sup>1</sup>

Vehicles available for maximum service: 128

### 1999 Financial Statistics:

*Total Operating Expenses:* \$19,728,712

*Total Passenger Fare Revenues Earned:* \$2,483,186

*Total Passenger Fare Revenues Expended:* \$2,483,186 (13% of operating funds)

*Local Funds Expended:* \$16,825,802 (85% of operating funds)

*State Funds Expended:* 0

*Federal Assistance:* 0

*Other Funds:* \$417,724 (2% of operating funds)

*Annual Vehicle Revenue Miles:* 4,856,368

1999 Service Efficiency: \$4.47 operating expense per vehicle revenue mile

### 1999 Cost Effectiveness:

*Operating Expense per Passenger Mile:* \$0.84

*Operating Expense per Unlinked Passenger Trip:* \$2.55

1999 Service Effectiveness: 1.75 unlinked passenger trips per vehicle revenue mile

Major Local Source of Funding: \$5,000,000 a year from ¼ of 1% transportation infrastructure gross receipts tax.<sup>2</sup>

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<sup>1</sup>Albuquerque City Council Resolution R-27 F/S, Enactment no. 32-2000 Attachment A, approved March 24, 2000.

# Fort Worth, Texas

*Fort Worth Transportation Authority, "The T"*

1990 Census Urbanized Area Population: 3,198,259

1999 Service Area's Population Estimate: 506,100

1999 Service Area: 294 Square Miles

1999 Ridership:

*Annual Passenger Miles:* 28,374,405

*Annual Unlinked Trips:* 5,650,667

Hours of Operation: Monday – Saturday: 5:00AM – Midnight, Sundays and Holidays: 6:30 AM – 9:00 PM<sup>3</sup>

Vehicles Available for Maximum Service: 242

1999 Financial Statistics:

*Total Operating Expenses:* \$27,535,067

*Total Passenger Fare Revenues Earned:* \$4,296,848

*Total Passenger Fare Revenues Expended:* \$4,296,848 (15% of operating funds)

*Local Funds Expended:* \$11,785,426 (42% of operating funds)

*State Funds Expended:* 0

*Federal Assistance:* \$9,119,108 (33% of operating funds)

*Other Funds:* \$2,553,554 (10% of operating funds)

*Annual Vehicle Revenue Miles:* 7,568,399

1999 Service Efficiency: \$4.53 operating expense per vehicle revenue mile

1999 Cost Effectiveness:

*Operating Expense per Passenger Mile:* \$0.83

*Operating Expense per Unlinked Passenger Trip:* \$3.96

1999 Service Effectiveness: 1.14 unlinked passenger trips per vehicle revenue mile

Major Local Source of Funding: ½ cent sales tax<sup>4</sup>

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<sup>3</sup> Fort Worth Transportation Authority – The T, Texas Department of Transportation, [www.capmetro.austin.tx.us/DOCUMENTS/factsheet.htm](http://www.capmetro.austin.tx.us/DOCUMENTS/factsheet.htm)

<sup>4</sup> Anderson, D. Personal Communication, 8/2000. Director of Planning and Scheduling, Fort Worth Transportation Authority. Fort Worth, Texas.

# Tucson, Arizona

*Sun Tran*

1990 Census Urbanized Area Population: 579,235

1999 Service Area's Population Estimate: 503,991

1999 Service Area: 242 square miles

1999 Ridership:

*Annual Passenger Miles:* 64,056,143      *Annual Unlinked Trips:* 17,528,057

Hours of Operation: Monday – Friday : 5:45 AM – 11:30 PM, Saturday and Sunday: limited hours<sup>5</sup>

Vehicles Available for Maximum Service: 261

1999 Financial Statistics:

*Total Operating Expenses:* \$33,107,753

*Total Passenger Fare Revenues Earned:* \$6,343,587

*Total Passenger Fare Revenues Expended:* \$6,343,587 (19% of operating funds)

*Local Funds Expended:* \$20,932,236 (63% of operating expenses)

*State Funds Expended:* \$3,651,502 (11% of operating expenses)

*Federal Assistance:* \$1,904,322 (6% of operating expenses)

*Other Funds:* \$286,235 (1% of operating expenses)

*Annual Vehicle Revenue Miles:* 8,831,160

1999 Service Efficiency: \$3.94 operating expense per vehicle revenue mile

1999 Cost Effectiveness:

*Operating Expense per Passenger Mile:* \$0.45

*Operating Expense per Unlinked Passenger Trip:* \$1.60

1999 Service Effectiveness: 2.47 unlinked passenger trips per vehicle revenue miles

Major Local Source of Funding: City General Fund<sup>6</sup>

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<sup>5</sup> Transportation Management & Design. 2000. *Final Report, City of Tucson Transit System Restructuring Plan.*

<sup>6</sup> Ramsey, R. Personal communication, 8/2000. Director of Scheduling and Service Department. Sun Tran. Tucson, Arizona.

# Austin, Texas

*Capital Metro Transit Authority*

1990 Census Urbanized Area Population: 562,008

1999 Service Area's Population Estimate: 604,621

1999 Service Area: 572 square miles

1999 Ridership:

*Annual Passenger Miles:* 107,760,424      *Annual Unlinked Trips:* 36,137,439

Hours of Operation: Weekdays: 4 AM – 12:30AM, Saturday: 5 AM – 12:30AM, Sunday: 5:30 AM – 11:30PM<sup>7</sup>

Vehicles Available for Maximum Service: 444

1999 Financial Statistics:

*Total Operating Expenses:* \$71,193,837

*Total Passenger Fare Revenues Earned:* \$3,933,770

*Total Passenger Fare Revenues Expended:* \$8,601,630 (11% of operating funds)

*Local Funds Expended:* \$64,688,076 (81% of operating funds)

*State Funds Expended:* 0

*Federal Assistance:* 0

*Other Funds:* \$6,436,893 (8% of operating funds)

*Annual Vehicle Revenue Miles:* 16,053,811

1999 Service Efficiency: \$4.33 operating expense per vehicle revenue mile

1999 Cost Effectiveness:

*Operating Expense per Passenger Mile:* \$0.54

*Operating Expense per Unlinked Passenger Trip:* \$1.58

1999 Service Effectiveness: 2.73 unlinked passenger trips per vehicle revenue mile

Major Local Source of Funding:  $\frac{3}{4}$  of 1% sales tax<sup>8</sup>

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<sup>7</sup> Capital Metro, [www.capmetro.org/rout.html](http://www.capmetro.org/rout.html)

<sup>8</sup> Capital Metro Fact Sheet 1999 Current Service Delivery, [www.capmetro.austin.tx.us/DOCUMENTS/factsheet.htm](http://www.capmetro.austin.tx.us/DOCUMENTS/factsheet.htm).

# Corpus Christi

*Corpus Christi Regional Transit Authority*

1990 Census Urbanized Area Population: 270,006

1999 Service Area's Population Estimate: 315,000

199 Service Area: 838 square miles

1999 Ridership:

*Annual Passenger Miles:* 30,159,583      *Annual Unlinked Trips:* 5,843,883

Hours of Operation: Weekdays: 5:00AM – 10:30AM, Saturday: 5:30AM – 10:30PM, Sunday: 9:00AM – 7:30PM<sup>9</sup>

Vehicles Available for Maximum Service: 106

1999 Financial Statistics:

*Total Operating Expenses:* \$13,725,577

*Total Passenger Fare Revenues Earned:* \$1,084,829

*Total Passenger Fare Revenues Expended:* \$1,084,829 (8% of operating funds)

*Local Funds Expended:* \$11,677,957 (85% of operating funds)

*State Funds Expended:* 0

*Federal Assistance:* 0

*Other Funds:* \$962,791 (7% of operating funds)

*Annual Vehicle Revenue Miles:* 3,889,304

1999 Service Efficiency: \$4.20 operating expense per vehicle revenue mile

1999 Cost Effectiveness:

*Operating Expense per Passenger Mile:* \$0.38

*Operating Expense per Unlinked Passenger Trip:* \$1.94

1999 Service Effectiveness: 2.17 unlinked passenger trips per vehicle revenue

Major Local Source of Funding: ½ cent sales tax<sup>10</sup>

# San Antonio, Texas

<sup>9</sup> Corpus Christi Regional Transportation Authority-The B, Texas Department of Transportation.

[www.dot.state.tx.us/insdot/orgchart/ptn/ptninfo/MTA/CC.htm](http://www.dot.state.tx.us/insdot/orgchart/ptn/ptninfo/MTA/CC.htm)

<sup>10</sup> Haley, F. Personal communication, 11/2000. Director of Service Development, Corpus Christi Regional Transportation Authority – The B. Corpus Christi, Texas.

*VIA Metropolitan Transit*

1990 Census Urbanized Area Population: 1,129,154

1999 Service Area's Population Estimate: 1,358,087

1999 Service Area: 1,234 square miles

1999 Ridership:

*Annual Passenger Miles:* 184,362,329      *Annual Unlinked Trips:* 44,968,163

Hours of Operation: Monday – Friday: 4:30AM – midnight, Saturday and Sunday: 5:00AM – midnight<sup>11</sup>

Vehicles Available for Maximum Service: 827

1999 Financial Statistics:

*Total Operating Expenses:* \$88,989,867

*Total Passenger Fare Revenues Earned:* \$15,921,658

*Total Passenger Fare Revenues Expended:* \$15,921,658 (18% of operating funds)

*Local Funds Expended:* \$63,638,146 (73% of operating funds)

*State Funds Expended:* 0

*Federal Assistance:* \$3,128,326 (4% of operating funds)

*Other Funds:* \$4,305,562 (5% of operating funds)

*Annual Vehicle Revenue Miles:* 29,572,472

1999 Service Efficiency: \$3.43 operating expense per vehicle revenue mile

1999 Cost Effectiveness:

*Operating Expense per Passenger Mile:* \$0.40

*Operating Expense per Unlinked Passenger Trip:* \$1.58

1999 Service Effectiveness: 2.17 unlinked passenger trips per vehicle revenue mile

Major Local Source of Funding: ½ % sales tax<sup>12</sup>

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<sup>11</sup> VIA Metropolitan Transportation Authority, Texas Department of Transportation, [www.dot.state.tx.us/insdot/orgchart/ptn/ptninfo/MTA/VIA.htm](http://www.dot.state.tx.us/insdot/orgchart/ptn/ptninfo/MTA/VIA.htm)

<sup>12</sup> Ibid.

# El Paso, Texas

## *Sun Metro*

1990 Census Urbanized Area Population: 571,017

1999 Service Area's Population Estimate: 617,215

1999 Service Area: 247 square miles

1999 Ridership:

*Annual Passenger Miles:* 67,344,201      *Annual Unlinked Trips:* 13,056,143

Hours of Operation: Weekdays: 4:28AM – 10:45PM, Saturdays:4:42AM – 10:45PM, Sundays:  
6:02AM – 10:38PM<sup>13</sup>

Vehicles Available for Maximum Service: 248

1999 Financial Statistics:

*Total Operating Expenses:* \$33,325,183

*Total Passenger Fare Revenues Earned:* \$7,483,098

*Total Passenger Fare Revenues Expended:* \$7,459,895 (22% of operating funds)

*Local Funds Expended:* 0

*State Funds Expended:* \$18,730,520 (56% of operating funds)

*Federal Assistance:* \$6,675,655 (20% of operating funds)

*Other Funds:* \$459,113 (2% of operating funds)

*Annual Vehicle Revenue Miles:* 8,248,511

1999 Service Efficiency: \$3.56 operating expense per vehicle revenue mile

1999 Cost Effectiveness:

*Operating Expense per Passenger Mile:* \$0.35

*Operating Expense per Unlinked Passenger Trip:* \$1.75

1999 Service Effectiveness: 2.03 unlinked passenger trips per vehicle revenue mile

Major Local Source of Funding: ½% sales tax<sup>14</sup>

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<sup>13</sup> City of El Paso Mass Transit Department-Sun Metro, Texas Department of Transportation,  
[www.dot.state.tx.us/insdot/orgchart/ptn/ptninfo/MTA/ElPaso.htm](http://www.dot.state.tx.us/insdot/orgchart/ptn/ptninfo/MTA/ElPaso.htm)

<sup>14</sup> Charlene Santistevan, Sun Metro Authority Planning Department, El Paso, Texas, pers. Comm.