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I. INTRODUCTION

Acknowledgment

The author would like to thank DART personnel for their cooperation and assistance in providing documentation and answering questions.

Public Purposes

Any review of public transit should start with the fundamentals -- an understanding of its public purpose. The public purpose of any public agency, including the subject of this report, Dallas Area Rapid Transit (DART), may be stated in terms of *whom* is to be served and *why* it is appropriate for the public to provide a subsidy. The public purpose of public transit is to serve riders and taxpayers (the community).[1]

- The riders are served by the provision of a transit system that is efficient, effective, comprehensive and affordable. Transit's role is to serve riders by providing primary mobility for the transit-dependent and alternative mobility for people with automobiles.

- The taxpayers (community) are also served through the provision of a transit system that is efficient, effective, comprehensive and affordable. But for the taxpayers, transit's role is to provide societal benefits by serving the transit-dependent, such as low-cost transportation to work and school, and by making an alternative to the automobile available, for the purpose of reducing traffic congestion and air pollution in downtown oriented corridors.[2] Transit should generally maximize ridership with the revenues provided by the taxpayers.

It is for the accomplishment of these public purposes that public transit receives public subsidies. Two primary markets are serviced by public transit.

- **The transit-dependent market**: Public transit provides low-cost mobility to those with limited financial resources, or whose physical disabilities make transit service their only mobility alternative. These customers represent the transit-dependent market.

- **The discretionary market:** Public transit provides alternative transportation

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[1] "Taxpayers" describes the community in its function of paying for public services. The term "taxpayers" is considered synonymous with the term "community" throughout this report.

[2] The policy objective of attracting automobile drivers to transit, thereby reducing traffic congestion and air pollution, is in reality very narrow. Public transit is able to carry a significant percentage of commuter traffic only to concentrated downtown areas, which contain 10 percent or fewer of metropolitan jobs. Public transit cannot carry a significant percentage of non-downtown commuter trips (more than 90 percent of trips) because residential and employment locations are exceedingly dispersed (so much so that even car pools are difficult to sustain).

for people who would otherwise travel by automobile. Traffic congestion and air pollution in downtown oriented corridors can be reduced as a result of this alternative use. These customers represent the discretionary market.

For decades federal, state and local governments have provided subsidies to public transit to achieve these public purposes. The recipients of these subsidies have been public agencies, such as DART, established to ensure the availability of public transit service.

Private Purposes

Private interests -- management, labor, vendors, etc. -- may be the indirect recipients of public transit subsidies, but only to the extent necessary to achieve the public purpose. No less than $1.00 in value should be received for every $1.00 paid by the riders and taxpayers. Any activity or cost that does not provide benefits to the riders and the taxpayers detracts from the public agency's potential to serve the public purpose, and is by definition a private purpose. For example, the following are private, not public purposes:

- **Institutional interests:** Any institutional (public agency) benefit beyond that necessary to achieve the public purpose serves private purposes. A public agency is fundamentally different from a private company, whose purpose is to provide a return on investment to owners. A public agency provides a return on investment to the taxpayers (community) by performing its public purpose. The institution itself is simply a conduit for service delivery. Institutional interests may be served only to the extent required to serve the public purpose. The responsibility of a transit board of directors is to represent the interest of these bodies and the taxpayers they represent.

- **Employee interests:** Any obligation to provide employees with any benefit that exceeds market-determined compensation and legally mandated working conditions[3] serves a private, not public purpose. This distinction between public purpose and employee interest is especially important because labor issues have often been barriers to innovation in public transit. Public transit is not subsidized for the benefit of labor. If it were, then other failing industries and companies would have been similarly purchased and subsidized by government (such as steel mills, neighborhood grocery stores and other businesses that were unable to survive in the competitive market). Public transit is subsidized because it

[3] Not all legally mandated labor conditions are consistent with the public purpose. Any provision that grants privileges to one class of workers to the exclusion of other classes violates the public purpose. An example of such a privilege is the provisions of Section 13c of the Federal Transit Act.

represents an important public service to both riders and taxpayers (Appendix A: Transit's Obligation to Employees).

- **Vendor and contractor interests:** Any obligation to vendors or contractors (or any other private party) beyond payment of market-determined compensation for goods and services rendered in accordance with freely negotiated contracts serves a private, not public purpose.

DART Objectives

DART's mission is:

> *To build and operate an efficient and effective transportation system that, within the DART service area, provides mobility, improves the quality of life and stimulates economic development.*

Additional public objectives apply to all public agencies and programs. These are implicit values of "good government" in both Texas and the United States, and include the following:

- The public agency should serve only public purposes -- the serving of any private purposes is subordinate, and only to the extent necessary to achieve the public purposes.

- The public agency should use the most effective strategies for accomplishing its public purposes.

- The public agency should tax and spend no more than necessary to accomplish its public purposes. Government has an obligation to citizens and users to use tax funding and user fees efficiently.

- The public agency should operate consistent with applicable laws.

Particular government agencies achieve these values to a greater or lesser degree. They nonetheless represent objectives that should be sought in all public programs and by all public agencies.

Opportunity Analysis

This report is an independent opportunity analysis of DART. An opportunity analysis is similar to, but different from, a performance audit. A performance audit methodically reviews virtually every internal function of an organization, usually making a long list of recommendations for improvement. Some of the recommendations may be significant, while others are not. For example, the

recent State Comptroller's *Performance Review* [4] of Austin's Capital Metro made 45 recommendations, while the KPMG Peat Marwick performance audit [5] made 76 recommendations. Performance audits often compare results to a group of "peer" public agencies, which are invariably *not* the best in the industry. Performance audits generally do not project the longer term financial impacts of the package of recommendations and sometimes even fail to describe the gross short-term impacts. Finally, performance audits often limit their evaluation to results in relation to internally established objectives. Often the underlying question addressed by performance audits is:

How good is the public agency compared to the average in the field?

An opportunity analysis is also different from "muckraking," which can engage in indiscriminate criticisms of the agency, board and management. Issues are selected based upon "headline" appeal rather than the potential to improve the accomplishment of public purposes. Often, muckraking seeks a person ("villain") to assume responsibility for the identified problem. Muckraking can serve a legitimate purpose, such as in the occasional case of illegal activity. More often than not, however, muckraking does not improve service delivery or financial performance materially.

On the other hand, an opportunity analysis involves a policy-level review of the functions and issues most critical to performance of the public agency, with an emphasis on outcomes rather than processes (Table 1). The purpose of the review is to identify the most *significant* opportunities to improve organizational performance. Generally these opportunities are structural or systemic to the agency, and their implementation not only better positions the agency to accomplish its public purpose, but also solves other less significant problems in the process. The opportunities are analyzed including potential barriers. Both short- and longer- term impacts are estimated.

Performance is not compared to a selected list of "peers," but is rather compared to both the best agencies ("benchmarking") and to external (market) standards. In the course of the review, issues of superior performance are also considered with the intention of encouraging replication in similar public agencies. The focus of the opportunity analysis is more on the future and less on the past. It seeks to identify means to provide public services more effectively while minimizing costs to both users and taxpayers.

Finally, an opportunity analysis evaluates results both in relation to internally

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[4] John Sharp, *Public Transit Public Trust: A Performance Review of the Capital Metropolitan Transit Authority* (Austin: State Comptroller of Public Accounts, 1998).

[5] KPMG Peat Marwick LLP, *Capital Metropolitan Transportation Authority System Wide Performance Audit*, July 1997.

established objectives and externally established public purposes, both implicit and explicit. The underlying question addressed by the opportunity analysis is:

How good is the public agency compared to what it could be?

TABLE 1
COMPARISON OF
PERFORMANCE AUDITS (PERFORMANCE REVIEWS) AND OPPORTUNITY ANALYSES

Issue	Performance Audit	Opportunity Analysis
Focus	Processes and "Micro" issues	Outcomes and "Macro" issues
Comparisons	To a peer group sample	To a benchmark representing the best performance
Policy question	*How good is the public agency compared to the average in the field?*	*How good is the public agency compared to what it could be?*

II. TRANSIT IN THE UNITED STATES

Until recent decades, urban public transit service in the United States and most of the developed world was provided by private monopolies.[6] Especially during the 1960s and 1970s, these monopolies, including a limited number of public monopolies,[7] were no longer able to support comprehensive service structures with commercial revenues (largely fares). As a result, transit subsidy programs were established by local, state and federal governments. At the same time, public monopolies assumed responsibility for virtually all services.

Over the past 30 years, considerable sums have been used to subsidize transit -- total public subsidies have exceeded $360 billion, more than the cost of the interstate highway system.[8] As public funding has become available, transit agencies have spent considerable sums lobbying Congress, state legislatures and local governments for higher levels of tax support. Nationally, transit has focused primarily on revenue enhancement.[9] Transit has been considerably less

[6] Many metropolitan areas had more than one private monopoly, with each company holding exclusive rights to a geographic area or type of service (such as local service or commuter express service).

[7] Such as the New York City Transit Authority, the Chicago Transit Authority, the San Francisco Municipal Railway and the Austin Transit System.

[8] Calculated using FTA and Federal Highway Administration data.

[9] This does not characterize all transit agencies. For example, San Diego and Las Vegas have demonstrated a strong commitment to cost minimization.

aggressive in its efforts to minimize unit operating costs.[10]

It would not be inappropriate to characterize the attitude of the national transit industry to be that "[t]he answer to every question is more funding." History suggests, however, that more money has done little to improve transit's performance relative to its customers, the riders, the taxpayers and the community. Worse, transit agencies and transit agency associations have regularly opposed legislative proposals to improve cost effectiveness.

Declining ridership: U.S. transit's ridership (boardings)[11] trends are also unfavorable.

- 1996 National Transit Database information indicates that transit ridership remains below that of 1970 (Figure 1 and Table E-1).[12]

- Annual boardings per capita have dropped 25 percent since 1970. Annual trips per capita in 1996 were at their lowest point since before the turn of the century (1900). The loss has escalated in the 1990s, declining 10 percent from 1990 to 1996.[13]

[10] The cost of operating a mile or hour of service. Unit operating costs are largely independent of ridership levels. The most effective measure of unit operating cost efficiency is cost per vehicle hour, rather than cost per vehicle mile, because the latter can be strongly influenced by agency to agency variations in speed, which result from differing levels of traffic congestion. Further, cost efficiency is best measured in terms of "vehicle" hours, rather than "service" hours or "revenue" hours, because the service hours are influenced by policy decisions with respect to service mix. An agency providing a greater percentage of peak period express service will tend to have higher costs per service hour only as a result of its policy decision. Cost efficiency should be measured based upon "input" cost (cost per vehicle hour), not "output" cost (cost per service hour).

[11] U.S. public transit systems measure ridership in "boardings." A boarding occurs each time a passenger enters a transit vehicle. A single passenger trip may involve more than one boarding. For example, a passenger who transfers from one bus to another to complete a trip is counted as two boardings.

[12] A 1997 report by Don Camph, *Dollars and Sense: The Economic Case for Public Transportation in America*, (Sponsored by the Campaign for Efficient Passenger Transportation) indicated that transit ridership increased 15 percent from 1970 to 1994. The source for this statement is the USDOT 1997 National Transportation Statistics (page 234). The source referenced is inappropriate for comparison of 1970 with subsequent years, since only four of nine transport modes were reported in that year. All nine modes were reported in 1994. Missing modes in 1970 included commuter rail, ferry boat, van pool, demand-responsive and "other."

[13] The loss in ridership per capita is actually greater. As new rail systems have opened, more passengers are counted twice when they transfer between bus and rail.

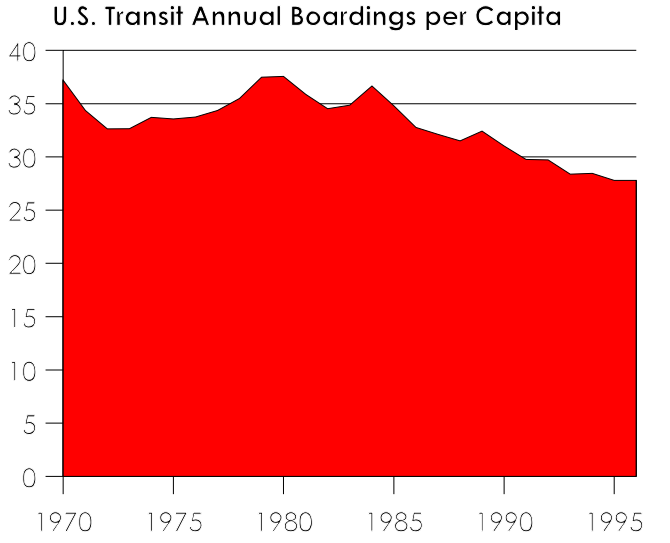

Figure 1
Calculated from National Transit Database and American Public Transit Association data.

Transit's loss has been greatest in the larger metropolitan areas.

- Transit's share of work trips --- the trip most important with respect to traffic and air pollution reduction --- has been falling for decades. The national loss since 1960 is estimated to be at least 60 percent.

- During the 1980s, transit's work-trip market share declined in all but two of the 39 metropolitan areas with more than one million population (in 1980). Transit's market share grew only in Houston and Phoenix. Market share dropped in all metropolitan areas that built or expanded urban rail systems.[14]

- The declining per capita ridership in the 1990s suggests that transit's work trip market share is continuing its downward trend.

[14] Market share increased in only Houston and Phoenix, which greatly increased bus service levels. Both metropolitan areas had small market shares in 1980.

Downtown Transit Authorities: Transit's share of all urban trips is very small -- approximately two percent.[15] Most transit systems are designed to primarily serve two markets:

- Residents in the dense inner cities (often these are areas much smaller than the corporate boundaries of the central city). Because of the higher densities, transit is able to supply high frequency services that provide good coverage. Inner city services tend to operate slowly compared to automobiles and transfers are often required. As a result, inner city services are not attractive to many people who have automobiles available. A large percentage of inner city ridership has low incomes and limited, if any, access to automobiles.

- Commuters to downtown: Transit provides frequent no-transfer bus and rail services to downtown, which are justified by employment densities that are far higher than in any other part of the urban area. Services tend to operate more slowly than the automobile, but attract some commuters who would otherwise travel by automobile. Downtown transit commuters tend to have near average incomes (six percent below average).[16]

With regards to attracting commuters from automobiles, transit agencies have effectively served only one destination --- downtown.[17] Downtown transit work trip market shares can be very high --- in four downtown areas more than 50 percent of employees use transit to get to work, and nine downtown areas have transit work trip market shares of 30 percent or more.[18] Downtowns, however, are not the dominant employment centers that they once were. On average, downtown areas contain no more than 10 percent of employment in major metropolitan areas --- more than 90 percent of metropolitan employment is now outside downtown.[19]

Transit's work trip market share is very small in virtually all other employment centers. In the 25 metropolitan areas with the largest downtown areas, transit carries only 3.4 percent of work trips to areas outside downtown. Even suburban

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[15] Nationwide Personal Transportation Survey, 1995 (United States Department of Transportation).

[16] Calculated from U.S. Census Bureau data.

[17] The Metropolitan Council's transit system in Minneapolis-St. Paul serves two downtown areas, Minneapolis and downtown St. Paul. In some other metropolitan areas, multiple downtown areas are served by comprehensive service by separate transit systems (such as the San Francisco Bay area, Los Angeles, New York, Dallas-Fort Worth and Seattle).

[18] Calculated from U.S. Census Bureau data (1990).

[19] Based upon an analysis of 1990 Census Bureau data in major metropolitan areas. Virtually all indications are that downtown areas have continued to lose market share to suburban employment locations during the 1990s.

centers on new rail lines have small transit market shares.[20] Few people who would otherwise commute by automobile use transit to reach other work destinations outside downtown, largely because service is slower and requires transfers. The average income of transit commuters to destinations outside downtown is more than 40 percent below average, which correlates with a much lower level of automobile availability than the population in general.[21]

Transit's downtown orientation results from the fact that there is insufficient concentration (density) of employment in other portions of urban areas.

While transit systems are often called regional transit authorities, their role is largely to provide mobility to downtown areas, at least with regards to services that are capable of attracting automobile drivers.[22] Little, if any, expedited regional service is provided to locations other than downtown.

Escalating Costs: Since public subsidies began, U.S. transit unit operating costs[23] have risen well above market rates.

- Since 1970, transit operating costs per mile have risen more than 55 percent (inflation adjusted).[24]

- Transit operating and capital costs per passenger rose 47 percent from 1983 to 1995 (inflation adjusted).[25]

- Transit operating costs per mile have risen at least 120 percent in relation to market costs. Commercial bus (market) costs have declined -- intercity and charter bus costs per mile have dropped by 31 percent since 1970.[26]

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[20] For example, Rosslyn, served by two rail lines in Washington has a 20 percent transit market share, while Silver Spring has a 15 percent share. Walnut Creek, a center well served by San Francisco's BART, has a transit market share of under five percent.

[21] Calculated from U.S. Census Bureau data, 1990.

[22] Transit performs an important service in providing mobility to the inner city poor, with relatively frequent service within walking distance of most locations. Outside inner cities, however, transit service is much more sparse and less effectively serves low income citizens.

[23] Cost per vehicle mile or cost per vehicle hour.

[24] The cost escalation has actually been even greater. In recent years, the National Transit Database has allowed "capitalization" of some costs that were formally reported as operating costs, which understates newer cost information relative to that of previous years. Before this change, transit costs had escalated to a more than 70 percent inflationary increase from 1970.

[25] 1983 was the first year the National Transit Database reported in a format comparable to 1995, allowing analysis of both capital and operating costs.

[26] Intercity and charter bus services were deregulated in the early 1980s, which replaced the previously monopolistic franchise system. This led to significantly lower unit costs. 1992-95 cost per mile increase estimated based upon change in average cost per mile of the class one carriers.

Comparative Productivity: Overall productivity of the transit industry has been substantially poorer than that of other passenger-transport industries.

- U.S. transit costs per passenger mile are significantly higher than any other mode -- nearly 50 percent greater than Amtrak, and four to six times that of automobiles (including personal trucks), airlines and intercity (private) buses and school buses (Figure 2).

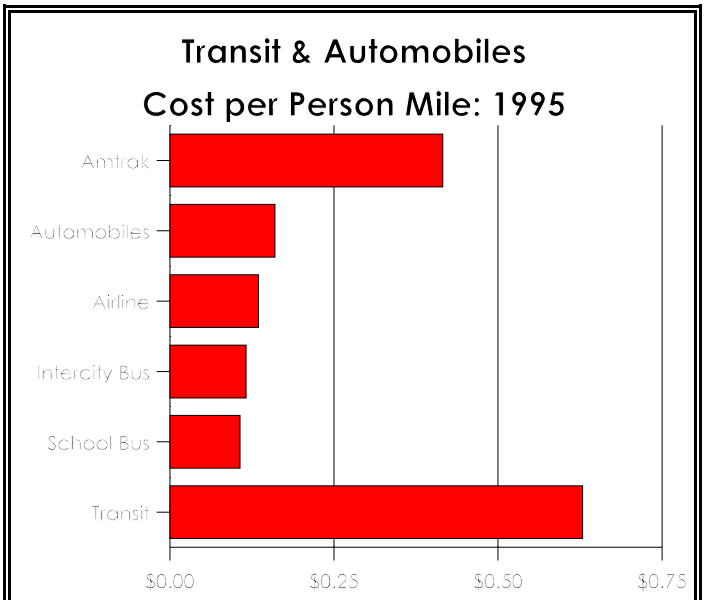

Figure 2
Calculated from National Transit Database and Federal Highway Administration data.

- Transit's cost escalation has exceeded that of other modes by a substantial margin. From 1970 to 1995, transit costs per passenger mile rose 164 percent (inflation adjusted). This substantial increase compares to an increase of 9 percent at Amtrak (from 1975), and cost reductions for automobiles, intercity buses and airlines (Figure 3). The intercity bus and airline industries were subjected to deregulation, which was a major factor in driving down unit costs.

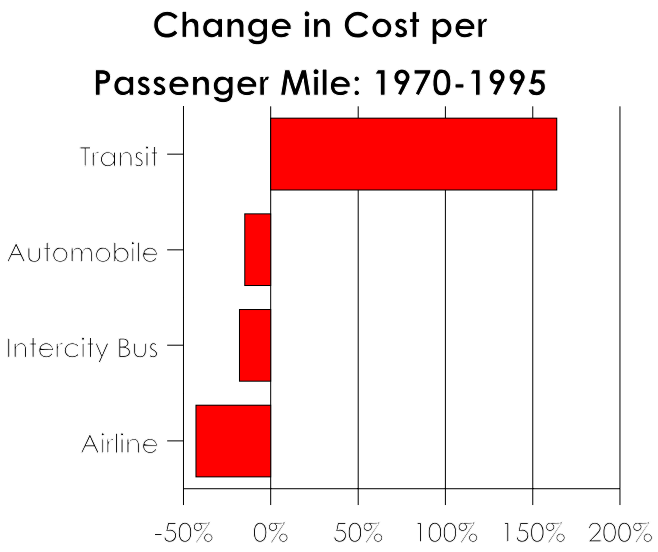

Figure 3
Calculated from U.S. Department of Transportation data.

Even industries not deregulated, however, generally experienced productivity gains over the period, reflecting the overall productivity improvements in the U.S. economy. Such gains, however, were not experienced in public transit.

The cause of transit's cost escalation is the political and monopolistic environment in which transit operates. It is a well known fact that monopolies tend to have higher costs and higher cost increases than organizations in a competitive environment.[27]

Energy Efficiency: Transit is popularly thought of as an energy-efficient mode of travel -- and it is if buses and trains operate at or near capacity. But transit vehicles average closer to empty, at 18.3 percent of capacity.[28] As a result, both transit buses and rail consume more energy per passenger mile (4,650 British Thermal Units or BTUs) than automobiles (3,467 BTUs). Transit buses now consume one-third more energy than automobiles and have become less energy-efficient than airlines (Figure 4).

[27] See for example, Robert L. Heilbroner and Lester Thurow, *The Economic Problem* (Englewood Cliffs, NJ: Prentice Hall: 1975), pp. 175-193.

[28] 1990 data. Later capacity usage data excluded by FTA from National Transit Database reports.

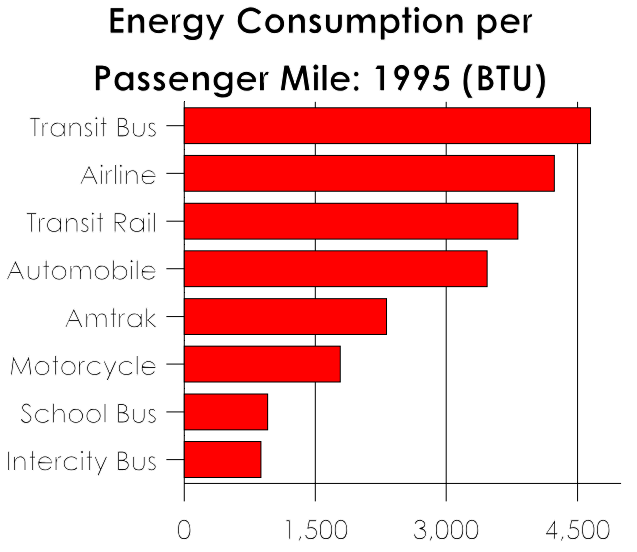

Figure 4
Calculated from U.S. Department of Transportation data.

Safety: U.S. transit is also popularly believed to be considerably safer than the automobile. Transit bus services are safer than automobiles. However, urban rail (light rail, heavy rail and commuter rail) is generally less safe than automobiles. (Figure 5).[29]

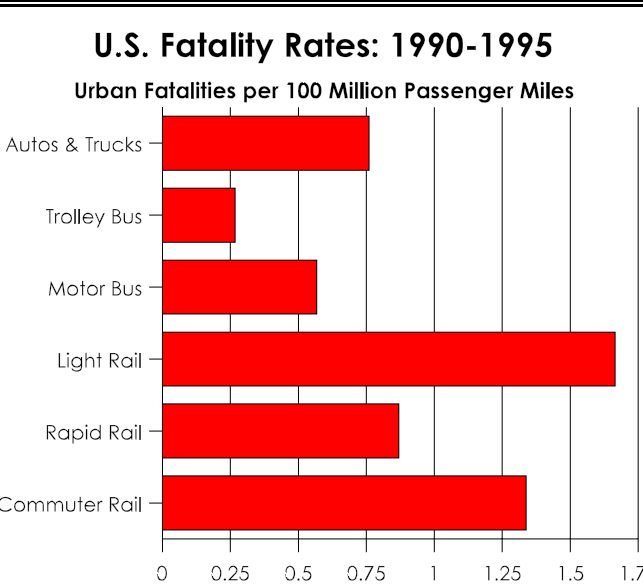

Figure 5
Calculated from National Transit Database and Federal Highway Administration data.

[29] Calculated from U.S. Department of Transportation data.

International Improvements Yet to Come in the United States. As in the United States, subsidized public transit throughout the developed world has been characterized by low productivity. However, significant structural reforms have commenced in Europe, Australia, New Zealand and South Africa. In those locations, transit is well on the way to being transformed from a producer driven (special interest controlled) service into a customer driven public service. A small number of U.S. metropolitan areas have made significant strides, most notably San Diego and Las Vegas (Appendix C: Transit and the Market).

III. DALLAS: BACKGROUND

Dallas-Fort Worth is the nation's 9th largest metropolitan area,[30] with a population of nearly 4.6 million. It is one of the nation's fastest growing metropolitan areas, having added more than one-half million residents between 1990 and 1996. The metropolitan area ranks 49th nationally in percentage growth from 1990 and third in the number of new residents (among 273 metropolitan areas), following only Los Angeles, and Atlanta (Figure 6).[31] The Dallas-Fort Worth urbanized area (developed area) covered 1,443 square miles in 1990, an area larger than both the state of Rhode Island and the European nation of Luxembourg. The urbanized area population was 3,198,000.[32]

- The urbanized area population density of Dallas-Fort Worth is low, at 2,216 people per square mile, 62 percent below the nation's most densely populated urbanized area, Los Angeles (5,800 per square mile) and 35 percent less dense than the average of urbanized areas of more than one million population.[33] Dallas-Fort Worth is less dense than San Antonio and Houston, but more dense than Austin (Figure 7).

- Dallas-Fort Worth's development was more dense from 1980 to 1990, as the urbanized area increased in density 16 percent. This compares to the national major metropolitan average of 2.4 percent. Dallas-Fort Worth's densification was nearly six times that of Portland, which has the strongest density oriented regional planning policies in the nation (Figure 8).

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30 This report generally attempts to use data most relevant to the DART service area, which is limited to the Dallas area. In some cases it is necessary to use data for the entire Dallas-Fort Worth area. When the term "Dallas" is used, it refers only to the Dallas portion of the Dallas-Fort Worth area.

31 U.S. Census Bureau data.

32 "Urbanized area" is the U.S. Census Bureau designation for developed areas. Data is collected and reported only out of the decennial (10 year) census. Urbanized areas are the most appropriate definition for urban areas, but data is less available than in the case of metropolitan areas, which are generally composed of entire countries and therefore often include large undeveloped areas. In contrast, metropolitan areas are composed of complete counties.

33 Includes Buffalo, which fell below one million in 1990.

By comparison, U.S. urbanized area population densities average less than one-fourth of European urban area densities and from one-tenth to 1/50th of Asian urbanized area densities. At Paris densities, Dallas-Fort Worth could accommodate more than 25 million people.

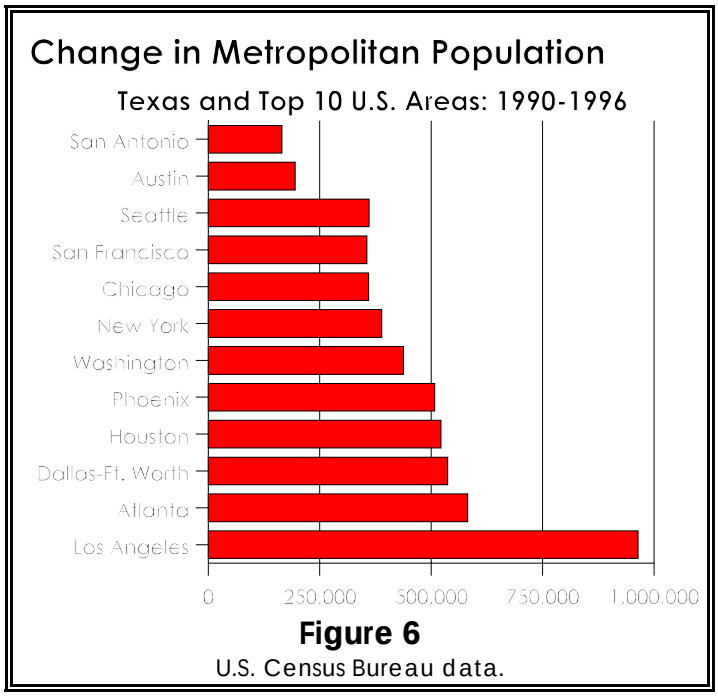

Figure 6
U.S. Census Bureau data.

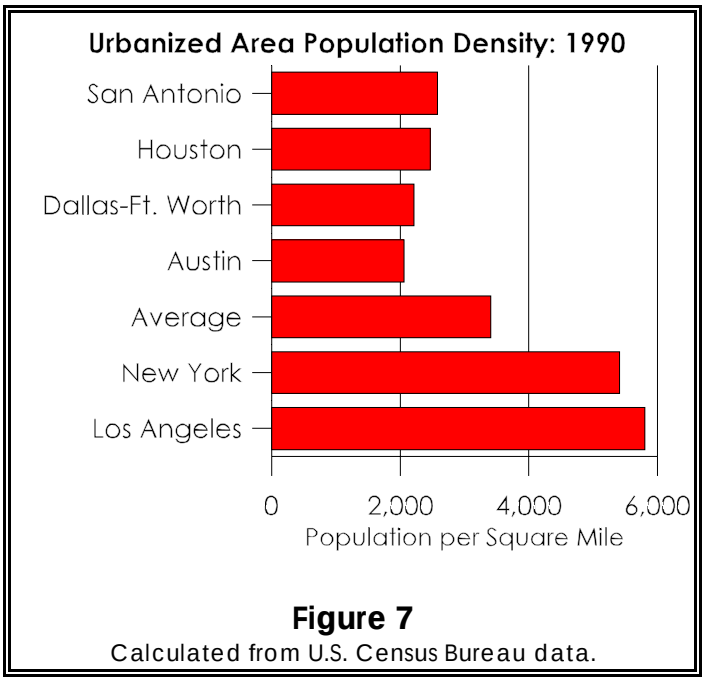

Figure 7
Calculated from U.S. Census Bureau data.

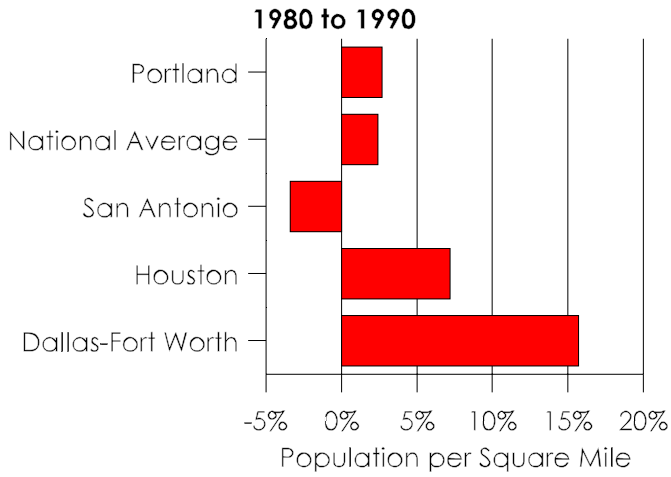

Figure 8
Calculated from U.S. Census Bureau data.

Income: Average per capita income in the Dallas-Fort Worth metropolitan area is $26,906, 4.2 percent above the national metropolitan average. This ranks Dallas-Fort Worth 14th among the nation's 47 metropolitan areas with more than one million population. Per capita income is slightly more than Houston, 14 percent above Austin and 27 percent above San Antonio (Figure 9 and Table E-2).

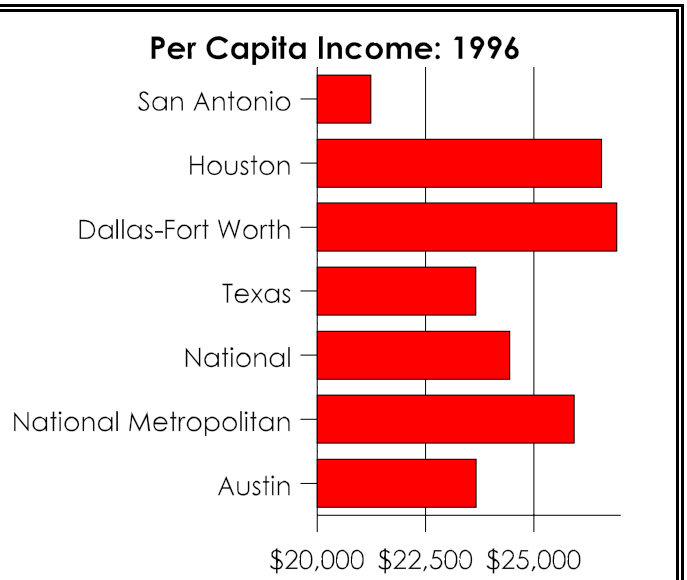

Figure 9
Calculated from U.S. Census Bureau data.

The Dallas-Fort Worth poverty rate (15.0%) is virtually the same as the national average (15.1%) and is the lowest among major Texas metropolitan areas (Figure 10).

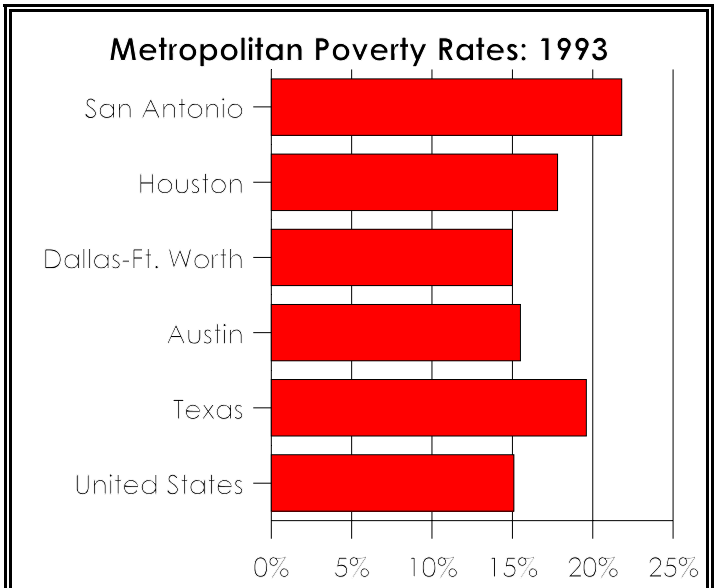

Figure 10
U.S. Department of Commerce Data.

Distribution of Employment: Downtown is the metropolitan area's largest employment center with 112,000 jobs.[34] Downtown also has by far the highest employment density, at approximately 70,000 jobs per square mile. This is nearly 35 times the average for the balance of the DART service area and more than 250 times the average for the Dallas-Fort Worth urbanized area (Figure 11). Even so, downtown represents only 10 percent of employment in the DART service (Figure 12) area and less than six percent of the employment in the Dallas-Fort Worth metropolitan area.

[34] Calculated from U.S. Census Bureau data, 1990.

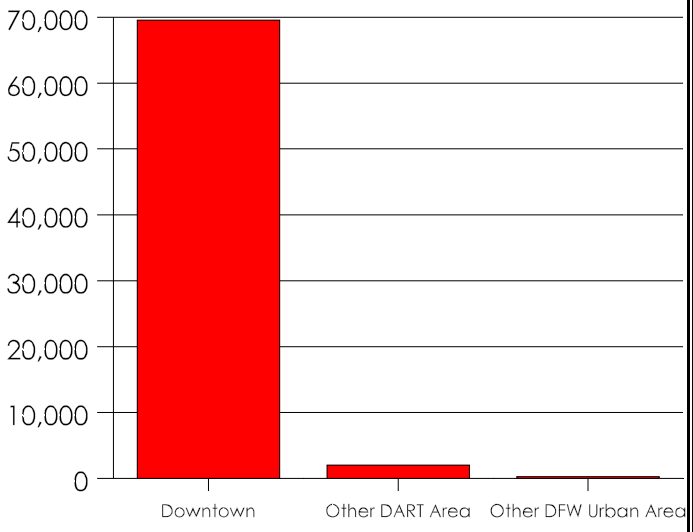

Figure 11

Estimated from U.S. Census Bureau and DART data.

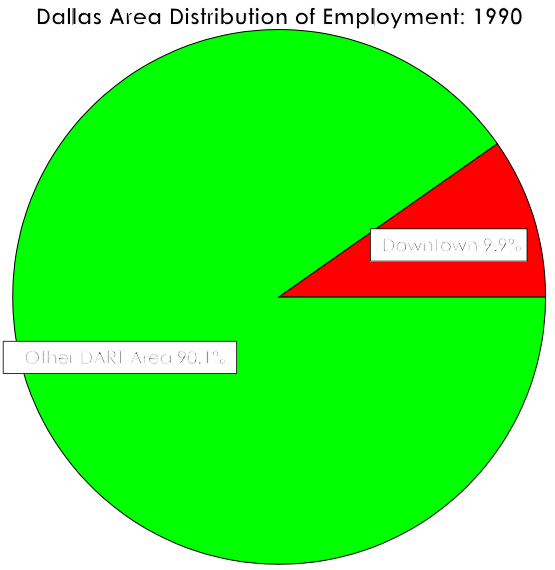

Figure 12
Calculated from U.S. Census Bureau data.

Traffic Congestion: Texas Transportation Institute data indicates that the Roadway Congestion Index rose 32 percent from 1982 to 1996, from 0.84 to 1.11 (Figure 13). The Dallas traffic congestion increase was 41st worst among the 57 urbanized areas with more than 500,000 population (Figure 14 and Table E-3). The 1.11 Roadway Congestion Index indicates that roadway demand exceeds capacity by approximately 11 percent.[35] Dallas-Fort Worth ranks 18th worst in traffic congestion out of 70 urbanized areas.

The increase in traffic congestion is in contrast to the experience in Houston, which has significantly reduced traffic congestion, primarily through expanding its highway system (Figure 15). Since 1982, Houston has expanded its freeway[36] system at more than three times the rate of Dallas.[37]

The average speed on Dallas freeways in 1996 during peak period is 44 miles per hour, down three miles per hour from 47 miles per hour in 1982. The average peak period arterial street speed has also dropped four miles per hour from 33 to 29 over the same period (Figure 16).[38] It is estimated that these speeds add eight minutes to the average work trip (compared to the travel time that would

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[35] Developed by the Texas Transportation Institute of Texas A&M University, a Roadway Congestion Index figure of 1.00 indicates that there is sufficient capacity to accommodate traffic volumes. An index value above 1.00 indicates that there is more traffic volume than capacity. Los Angeles had the highest 1996 Roadway Congestion Index, at 1.57.

[36] The term "freeway" as used in this report includes all grade separated highways, including toll roads.

[37] Calculated from Texas Transportation Institute data.

[38] Texas Transportation Institute.

result if there were no traffic congestion).[39] Average work trip time was 24.1 minutes in 1990, up 1.7 minutes from 1980.[40]

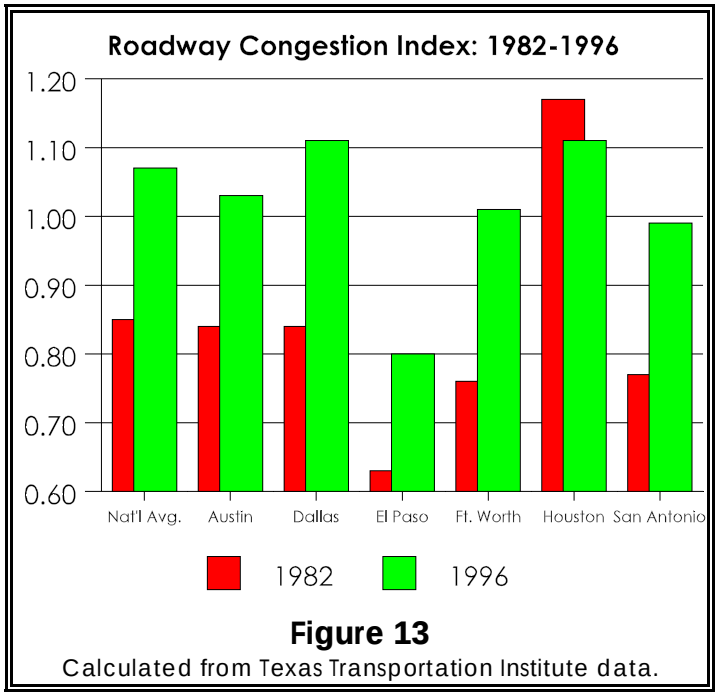


Figure 13
Calculated from Texas Transportation Institute data.

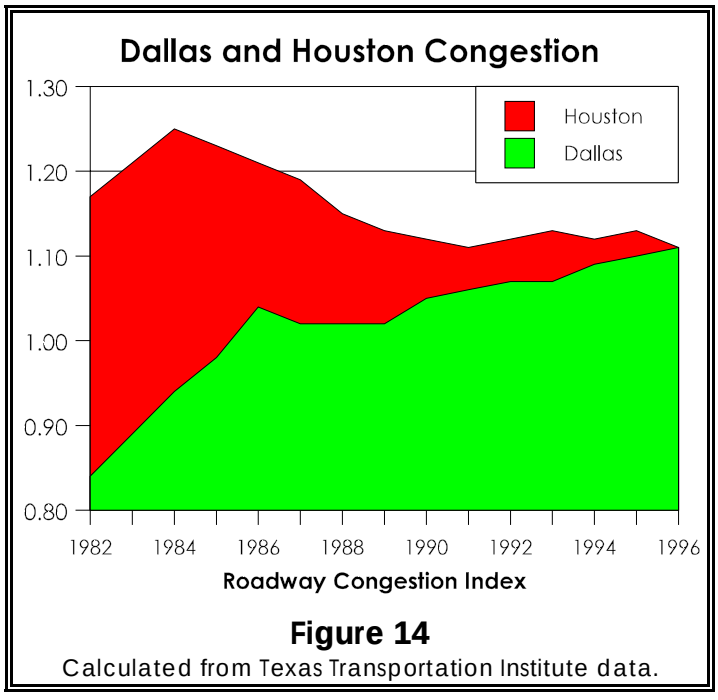


Figure 14
Calculated from Texas Transportation Institute data.

[39] Assumes the average Dallas-Fort Worth automobile work trip time of 24.1 minutes (U.S. Census Bureau), with 1/3 of the trip on arterials and 2/3 of the trip on freeways (free flow speed for freeways is 60 miles per hour and for arterials is 35 miles per hour).

[40] U.S. Census data.

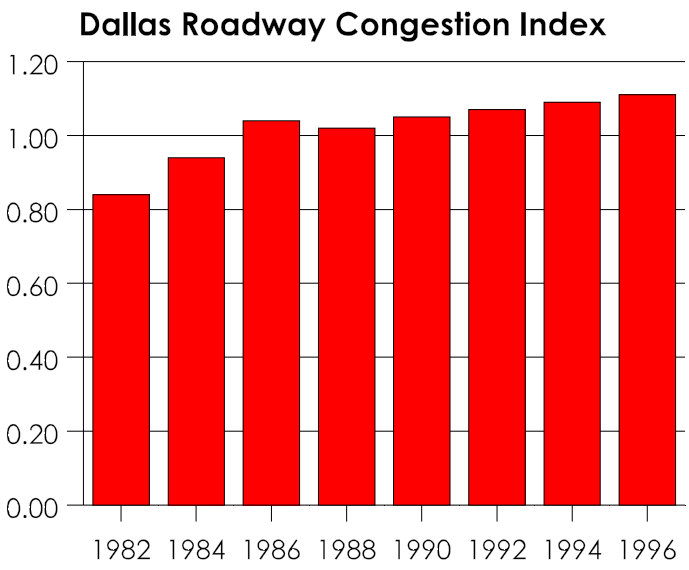


Figure 15
Texas Transportation Institute data.

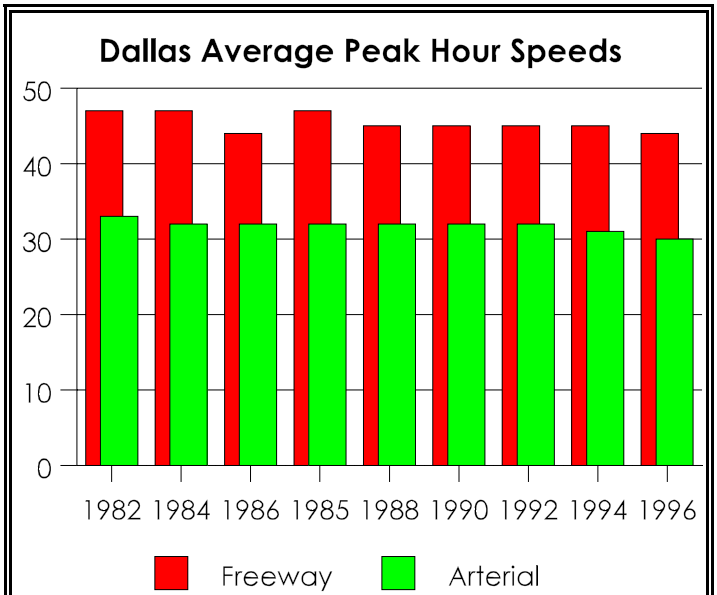


Figure 16
Texas Transportation Institute data.

IV. TRANSIT IN DALLAS-FORT WORTH

The Dallas-Fort Worth area is served by multiple public transit operators. More than 80 percent of the fixed route (bus and rail) transit service is provided by DART. The Fort Worth Transit Authority is the other major service provider.

Ridership

Dallas-Fort Worth ranked 21st among major metropolitan areas in overall fixed route[41] boardings in 1996, compared to its 9th ranking in metropolitan population (Table E-4).[42] From 1980 to 1996, ridership increased 12.4 percent.

Dallas-Fort Worth ranks lower in annual per capita boardings by transit (13.6), at 31st nationally, approximately 50 percent below the major metropolitan average (Table E-5).[43] Dallas-Fort Worth has the lowest per capita ridership of any major metropolitan area in Texas, at approximately one-half the rate of Austin and San Antonio.[44]

Per capita boardings declined 11.5 percent from 1980 to 1996, compared to a 25 percent drop in major metropolitan areas (Figure 17). This ranks 14th among major metropolitan areas (Table E-6). The Dallas-Fort Worth decline was considerably less than that of San Antonio (-26.5 percent), but well below the increases in Austin (100.5 percent) and Houston (26.3 percent).

[41] Fixed route includes bus and rail service.

[42] Calculated from the National Transit Database.

[43] U.S. transit ridership per capita is very low by world standards. Canada's annual per capita ridership is double that of the U.S., while European cities typically have annual per capita ridership of from 200 to 500, up to 15 times that of the United States.

[44] This compares Houston bus ridership with Dallas-Fort Worth bus, light rail and commuter rail ridership. Houston's advantage over Dallas-Fort Worth is even greater because passengers who transfer between bus and rail services are counted twice.

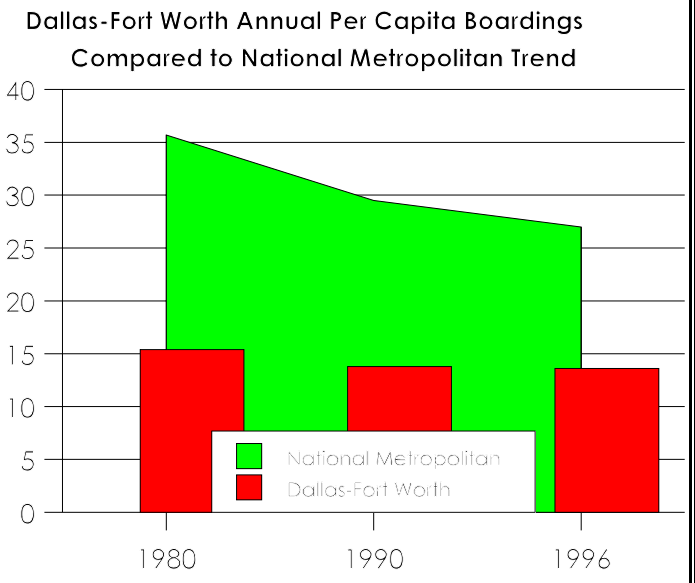


Figure 17
Calculated National Transit Database and American Public Transit Association information.

Service Level: The Dallas-Fort Worth metropolitan area has a lower than average level of service, with 0.545 annual vehicle hours of service per capita (service intensity), compared to the national average of 0.754. The Dallas-Fort Worth metropolitan area ranks 29th among major metropolitan areas in service intensity (Figure 18 and Table E-7).

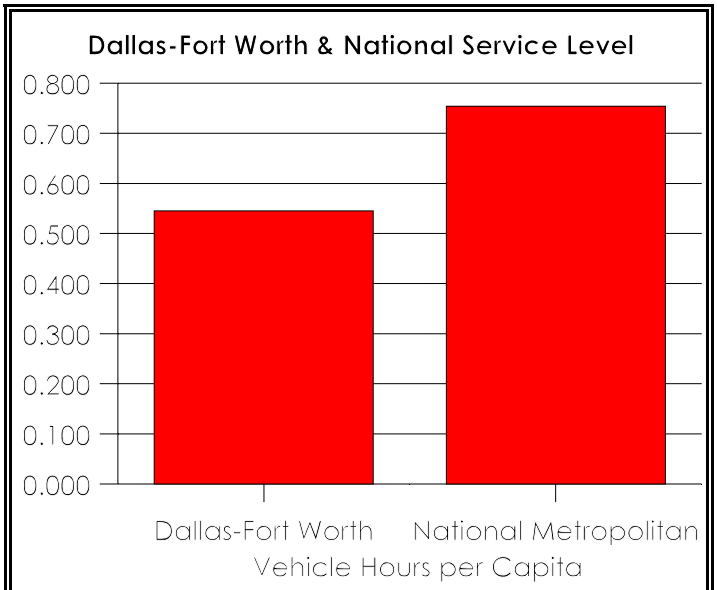
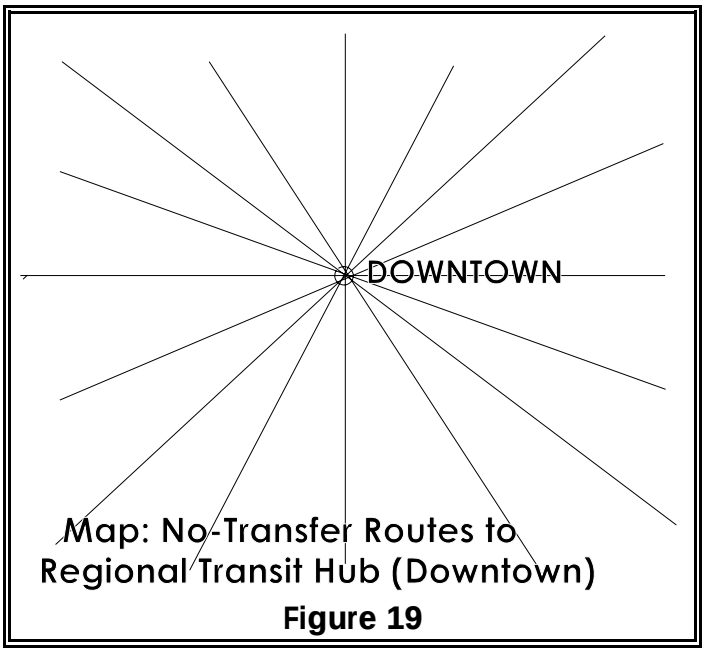


Figure 18
Calculated National Transit Database.

The DART Transit System

DART provides bus, rail and paratransit (dial-a-ride) services and manages the high occupancy vehicle lane (HOV) system in the Dallas area. The service area is 689 square miles and contains a population of 1,900,000. DART was established in 1983 by a referendum, which included approval of a sales tax to support public transit services. DART has since assumed the operations of the former Dallas Transit System and established new services. Like most U.S. transit systems, most of DART's service is oriented toward a downtown regional hub. This makes it possible to reach downtown without transferring from most parts of the service area (Figure 19).



Map: No-Transfer Routes to Regional Transit Hub (Downtown)

Figure 19

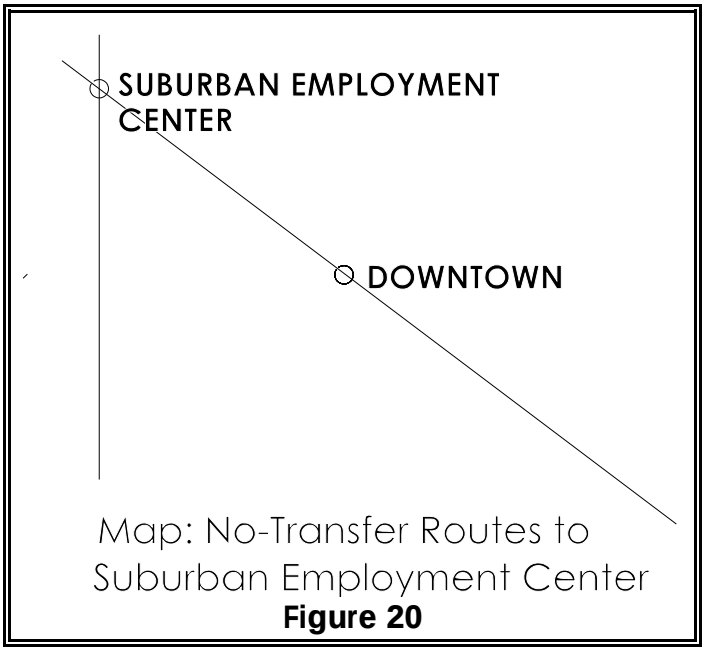
Like virtually all U.S. transit systems, little service not requiring transfer is provided to any other areas. Generally, only one, two or at most three transit routes serve any location, and often no service is provided by express buses. As a result, it is not possible to reach other destinations from throughout the metropolitan area without excessive trip times (Figure 20). This makes service to destinations other than downtown unattractive to people with automobiles. As a result, users of such services not oriented to downtown tend to not have automobiles available as an alternative (largely as a result of having low incomes). The intensity of DART service in the downtown area is at least seven times that of any other part of the service area, and up to 300 times that of the least well served portion.[45]

Transit's failure to provide attractive service to areas other than downtown is the result of two principal factors:

[45] Calculated from data in DART *Five Year Action Plan: 1998-2002*, December 9, 1997, p. 41.

- Employment densities are far higher in downtown areas than in any other area. High levels of transit service can only be justified to downtown.

- The spatial arrangement of employment locations in newer suburban centers is not conducive to transit service. While some suburban centers have high employment populations, they tend to be built on large lots with considerable distance between buildings. Much of any large suburban employment center would be beyond walking distance from any transit line operating through the center.



Map: No-Transfer Routes to Suburban Employment Center

Figure 20

DART provides two basic types of conventional transit services:

- Local transit service (bus and light rail) that operates on surface streets or rights-of-way and makes frequent stops for passengers.

- Rapid transit service (express bus and commuter rail) that provides expedited trips to major employment centers. The overwhelming proportion of rapid transit service --- approximately 99 percent --- is oriented to downtown (Figure 21).

Overall, approximately 88 percent of DART's bus riders[46] and 100 percent of

[46] Calculated from *Mobility 2020 The Metropolitan Transportation Plan,* North Central Texas Council of Governments, p. VI-18, 1997.

DART's rail riders use routes that are oriented to downtown.

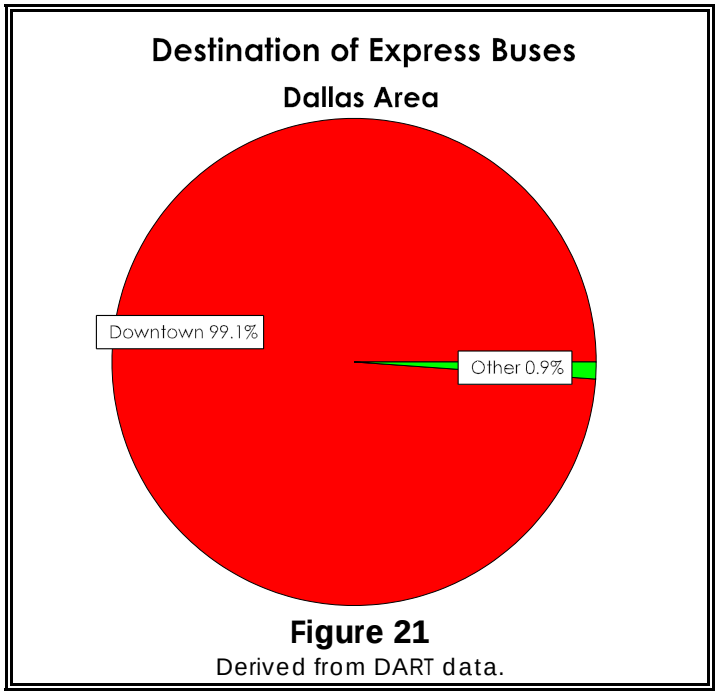


Figure 21
Derived from DART data.

Transit Ridership and Market Share

DART achieved its highest ridership in 1997, at 58.7 million boardings. This is 3.0 percent above the previous record of 57.0 million boardings set in 1991. Passenger revenue (fares) are up 5.7 percent, as a result of a 1995 fare increase. The passenger mile increase over 1991 was 1.3 percent.[47] Boardings have risen 38 percent (Figure 22) from the last year before DART's assumption of the transit

[47] The lower passenger mile increase relative to boardings reflects the larger number of transfers that are required due to the addition of light rail. Some bus routes that used to travel to downtown now travel only to outlying rail stations, where riders are required to transfer to complete their trips. DART references the increased transfers due to light rail in its 1997 National Transit Database report.

system (1984).

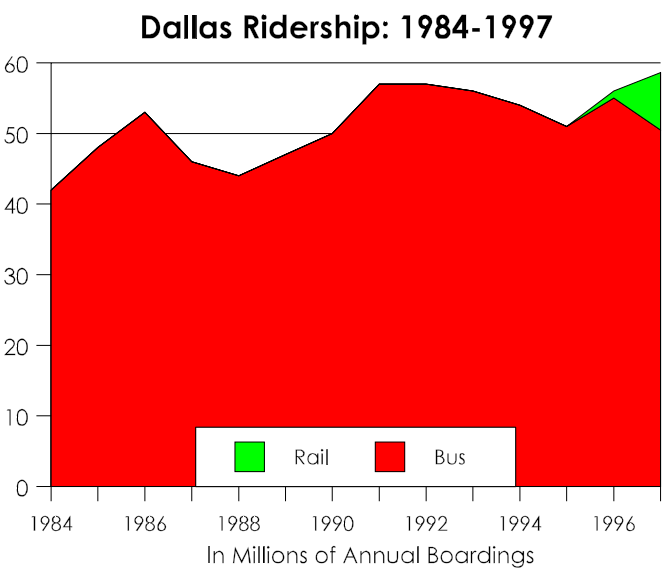


Figure 22
Calculated from Texas Transportation Institute data.

DART provides, approximately 1.0 percent of the daily person miles in the Dallas area (Figure 23).[48] The overwhelming percentage of trips are by automobile.

[48] Estimated from DART, Federal Highway Administration and Texas Transportation Institute data for the Dallas (not Dallas-Fort Worth). Assumes a conservative automobile occupancy of 1.3. If the national urban area automobile occupancy figure of 1.6 is assumed, the DART market share would be 0.8 percent. Transit's market share in the Dallas-Fort Worth urbanized area is estimated from 0.6 to 0.7 percent. This lower market share reflects the extremely low Fort Worth area transit market share (approximately 0.2 percent).

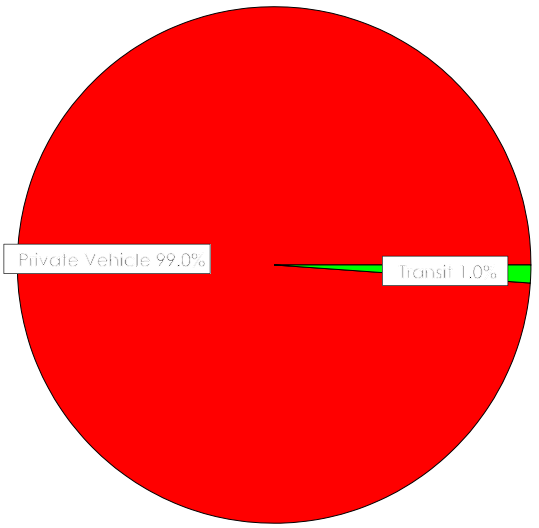


Figure 23
Calculated from U.S. Census Bureau data.

Transit Work Trip Market: With regard to the potential for reducing traffic congestion and air pollution, the work trip is by far the most important market for transit. Transit is most effective in serving high density employment centers where there is a sufficient concentration of workers to demand mass transit service.

Comparatively few of Dallas-Fort Worth work trips are by transit. In Dallas County, most of which is in the DART service area, transit's work trip market share was 4.2 percent in 1990, down from 5.3 percent in 1980. In the Dallas-Fort Worth metropolitan area as a whole, transit's work trip market share was 2.2 percent, down 31 percent from 1980 (Figure 24). Nearly twice as many people walk or work at home as ride transit to work in Dallas-Fort Worth.

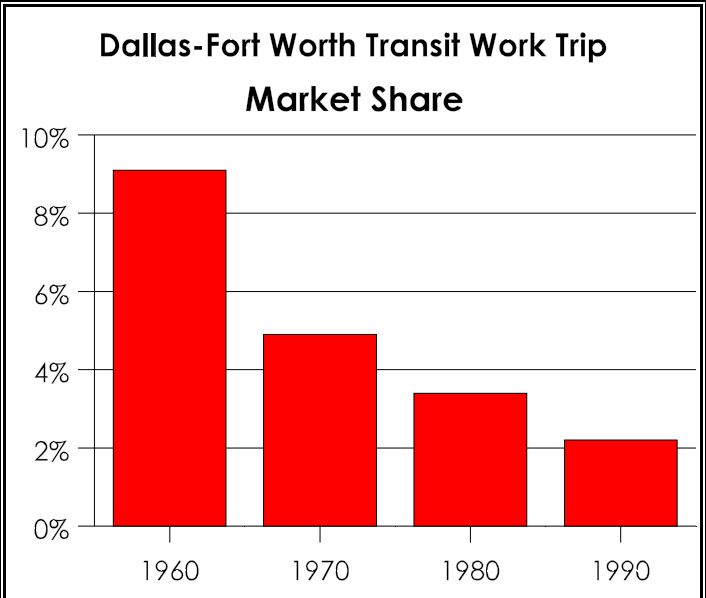


Figure 24
Calculated from U.S. Census Bureau data.

There was considerable geographic variation in the Dallas transit work trip market share in 1990.

- Downtown is the largest employment center in the metropolitan area, with approximately six percent of metropolitan employment and 10 percent of DART area employment. Downtown's transit work trip market share was 13.9 percent, which would rank it 25th nationally (Table E-9) and second in Texas (Figure 25). Downtown's single occupant automobile work trip market share was the third smallest among regional transit hubs in Texas, behind the University of Texas at Austin and downtown Houston (Figure 26).

- Transit's work trip market share in the remainder of the city of Dallas is 3.4 percent.

- In the part of DART's service area outside the city of Dallas, transit's work trip market share is 0.9 percent. In most member jurisdictions, the work trip market share is less than one percent (Table E-10).

- In the remainder of the Dallas-Fort Worth metropolitan area, transit's work trip market share is 0.5 percent (Figure 27).

As in virtually every other U.S. urban area, transit attracts a more than minuscule work trip market share only to central employment centers that are also transit hubs.

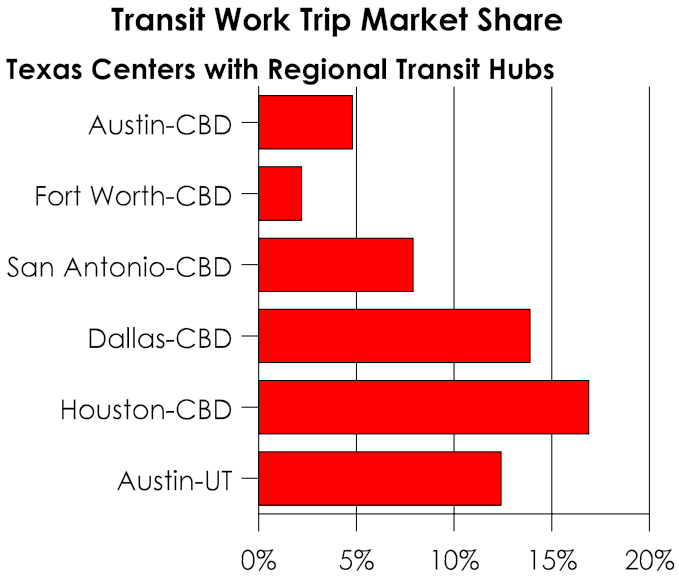


Figure 25

Calculated from U.S. Census Bureau data.

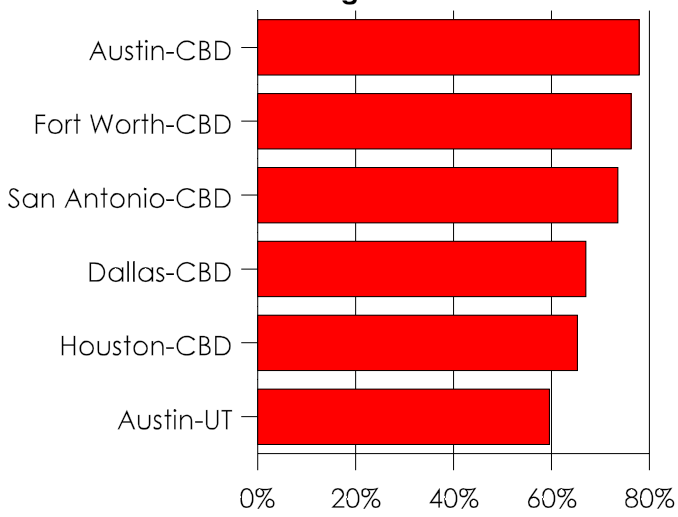


Figure 26
Calculated from U.S. Census Bureau data.

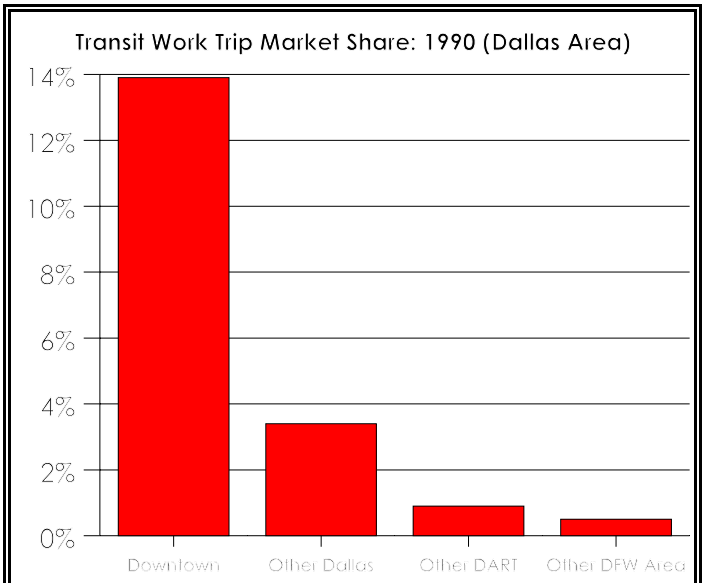


Figure 27
Calculated from U.S. Census Bureau data.

Ridesharing (car pools and van pools) has a market share that is more than three times that of transit in the DART service area, at 14.1 percent. Unlike transit, the ridesharing market share is relatively consistent throughout the area, with a 17.9 percent market share to downtown, 14.5 percent to the remainder of the city of Dallas, 12.5 percent to the remainder of the DART service area, and 14.0 percent to the portion of the Dallas-Fort Worth metropolitan area outside the DART service area (Figure 28). Overall, ridesharing accounts for 14.1 percent

of commuting in the Dallas-Fort Worth area, more than six times the market share of transit. Nonetheless, ridesharing dropped by nearly one-third between 1980 and 1990 (from 20.6 percent).[49]

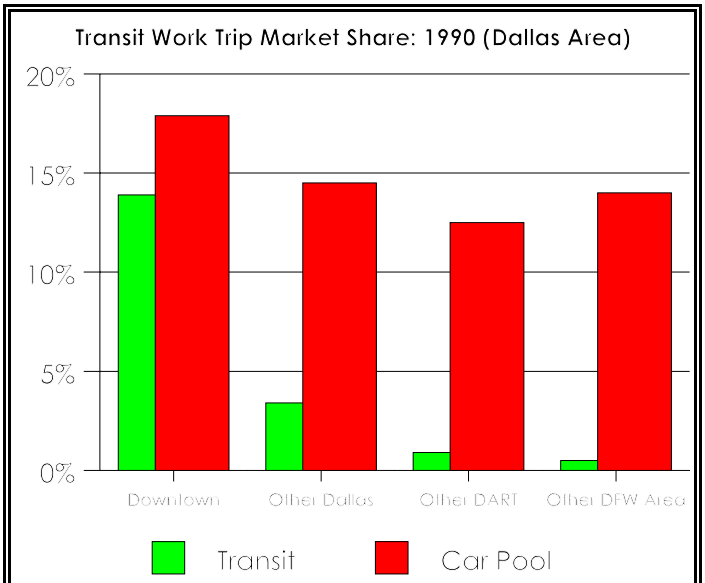


Figure 28
Calculated from U.S. Census Bureau data.

Transit Travel Speed: The average travel time for the transit work trip in Dallas-Fort Worth is 40.4 minutes. This is 65 percent above the average automobile commute trip of 24.5 minutes. Despite the estimated eight minutes lost due to traffic congestion ("Traffic Congestion" above), commuting by single occupant automobile is considerably more rapid (Figure 29).[50]

[49] Calculated from U.S. Census Bureau data (1990).

[50] Calculated from U.S. Census Bureau data.

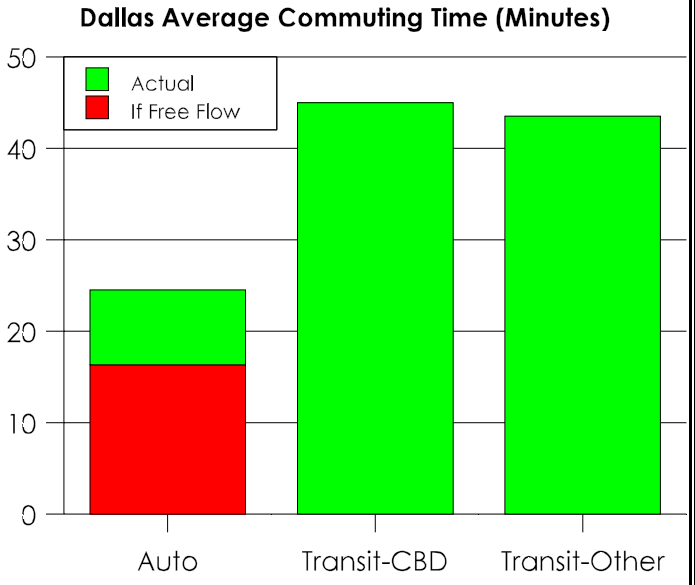


Figure 29
Calculated from U.S. Census Bureau and Texas Transportation Institute data.

Customers

DART customers have generally lower incomes than average and less access to automobiles.[51]

- Regular DART rider households have comparatively low access to automobiles (16 percent do not have automobiles).[52] A much lower percentage of people who ride DART occasionally do not have access to automobiles (one percent).

- DART riders have an average household income of $27,000, which is approximately 25 percent below the national average.

- U.S. Census Bureau data indicates that Dallas transit commuters (people who use transit for the work trip) have average incomes 31 percent below the Dallas-Fort worth metropolitan average (Figure 30).[53]

- Downtown Dallas transit commuters have 0.4 percent below average

[51] Howell Research Group, *Dallas Area Rapid Transit 1997 Climate Survey*, January 1997.

[52] No information was provided on the availability of a household member of an automobile for the trip taken by transit. This percentage is likely to be substantially higher.

[53] Calculated from 1990 U.S. Census Bureau data.

incomes.

- Transit commuters to Dallas-Fort Worth locations other than downtown have incomes 47 percent below average.[54] This lower income level would tend to indicate more limited automobile availability.

- Ridesharing commuters had higher incomes than transit passengers both downtown and outside downtown.

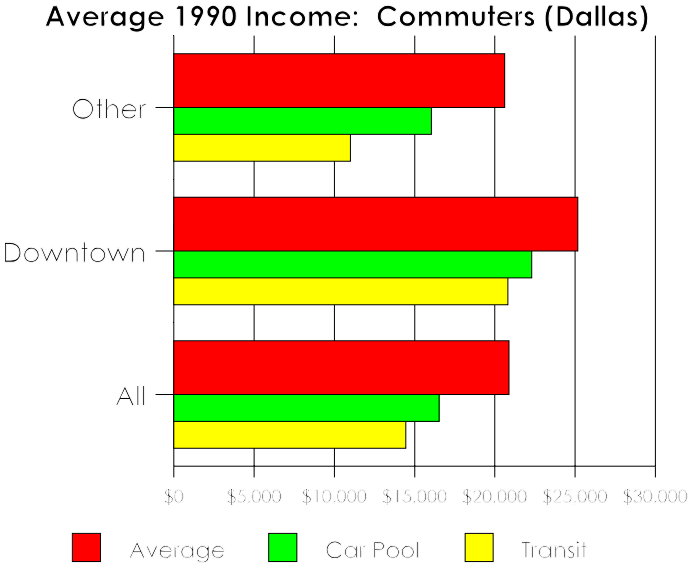


Figure 30
Calculated from U.S. Census Bureau data.

Ridership profile: This information indicates DART's ridership is more highly transit-dependent than average. Automobile availability is comparatively limited, and incomes are lower than average.

Customer Use of Service: DART has the 44th highest ridership utilization among 86 transit agencies operating 100 or more buses,[55] at 0.786 passenger miles per vehicle mile. This is eight percent below the average of 0.850 (Figure 31 and Table E-8) and 47 percent below the average of the top five systems (1.49).

[54] Calculated from 1990 U.S. Census Bureau data.

[55] Generally, DART is compared to other public transit agencies operating 100 or more buses. Not all public transit agencies report all information to the National Transit Database and as a result the number of agencies in the comparison will vary.

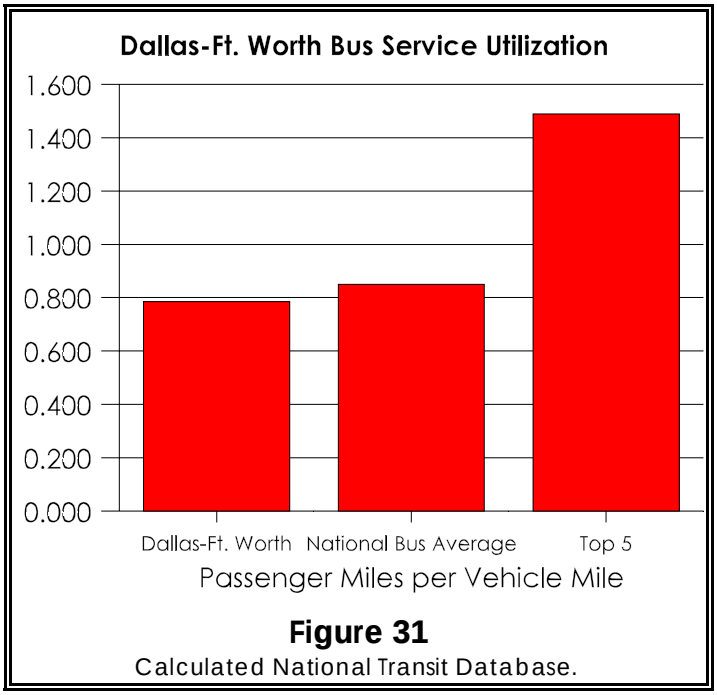


Figure 31
Calculated National Transit Database.

Ridership Response to Service Increases: DART has increased service levels more than 114 percent from before its establishment. Over the same period (1984-1997) boardings have increased 38 percent (Figure 32). Boardings rose at a rate of 34 percent relative to the service increase. This is less than one-half the national average for expanding transit agencies[56] and the lowest among the major Texas transit agencies (Figure 33).[57]

[56] An average increase of 0.788 percent in boardings occurred in response to a 1.0 percent increase in service, based upon an analysis of National Transit Database information for major transit operators implementing more than a 15 percent increase in service between 1985 and 1994.

[57] The largest fare increase in the nation in the last quarter century reduced San Antonio's service increase productivity from 72 percent to 52 percent from 1995 to 1997.

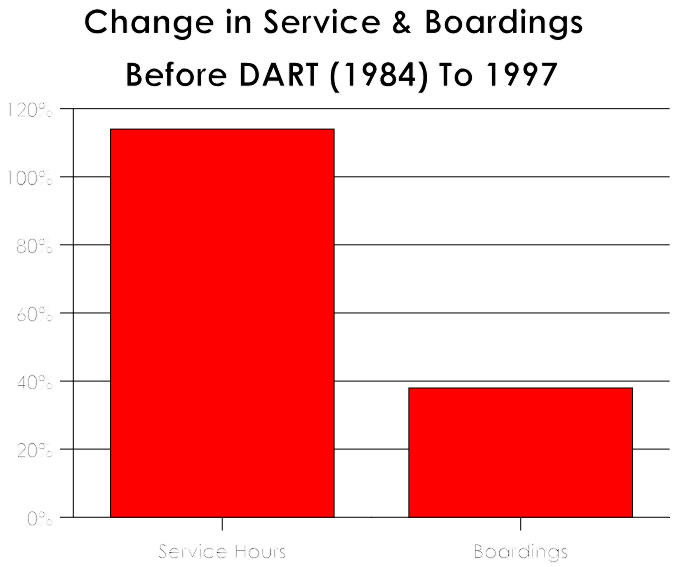


Figure 32
Calculated from APTA data and National Transit Database.

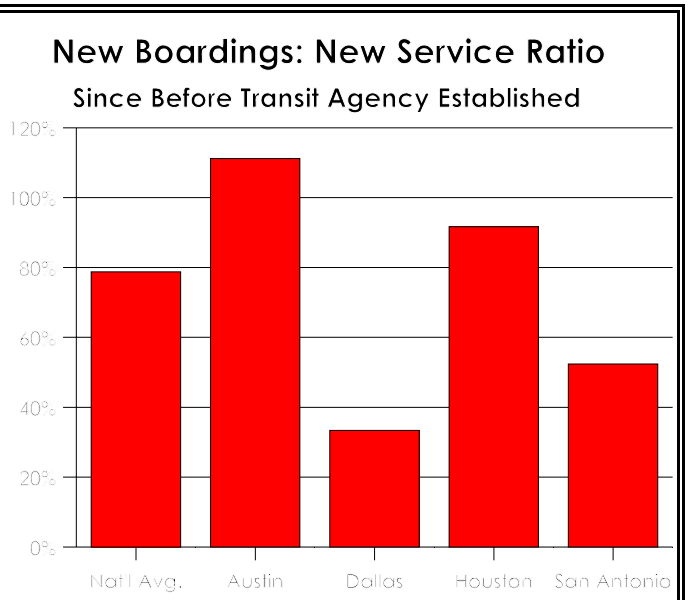


Figure 33
Calculated from APTA data and National Transit Database.

The less than robust response of DART area residents to ridership increases tends to indicate limited potential for expanding public transit ridership.

Transit and Automobile Drivers: However, the fact that so many riders do not have automobiles available suggests that DART removes even fewer automobiles than its 1.0 percent market share would seem to indicate. Based upon the low automobile availability of DART riders, it is estimated that transit ridership reduces Dallas area (not Dallas-Fort Worth) traffic congestion 0.8 percent.[58] Without transit, it is estimated that the Dallas Roadway Congestion Index would be 1.10 instead of 1.11.[59] To illustrate the overwhelming nature of transit's traffic congestion relief challenge, each year, the *increase* in private vehicle passenger volume (principally automobile) in the Dallas area is three times the *total* annual transit usage.[60]

Safety

DART's services are slightly less safe than the national transit average and the urban highway (automobile) average. DART's fatality rate is more than double that of Houston Metro and San Antonio's VIA, and nearly double that of Capital Metro in Austin (Figure 34).

[58] Assumes that 57 percent of DART riders have automobiles available and would use them as an alternative for the transit trip (automobile availability estimated through a comparative analysis of Austin and Houston transit riders automobile availability and income). In the Dallas-Fort Worth area, it is estimated that transit use reduces traffic volumes by 0.6 percent.

[59] The 1997 *Dollars and Sense* report estimated that without transit services it would be necessary to construct an additional 216 freeway lane miles in the Dallas-Fort Worth area. It is estimated that 190 of these miles would be in the Dallas area (based upon the share of transit ridership in the Dallas area compared to the Dallas-Fort Worth area) --- an expansion of freeway capacity by 10 percent. The report, which provided similar estimates for a number of other U.S. urban areas, has been criticized for its methodology (see "Notes on the Dollars and Sense Report, *The Urban Transport Fact Book,* Internet: www.publicpurpose.com/ut-$&sns.htm and John Semmons, *Rethinking Transit "Dollars and Sense": Unearthing the True Cost of Transit*, Reason Public Policy Institute, August 1998). If there had been 190 more miles of freeway lanes in Dallas, the 1996 Roadway Congestion Index would have been 7 percent lower, at 1.04. In reality, it is estimated that transit reduces freeway and arterial traffic by approximately 1.3 percent in the Dallas area. The *Dollars and Sense* estimate thus appears to be off by more than 400 percent. This small amount of transit substitution for automobiles is dispersed throughout the metropolitan area, so its impact may not be sufficient to have made any roadway expansions necessary.

[60] In passenger miles, using the 1990 to 1997 annual growth rate for private vehicles. Calculated using National Transit Database and U.S. Department of Transportation Federal Highway Administration data and a conservative 1.3 average private vehicle occupancy.

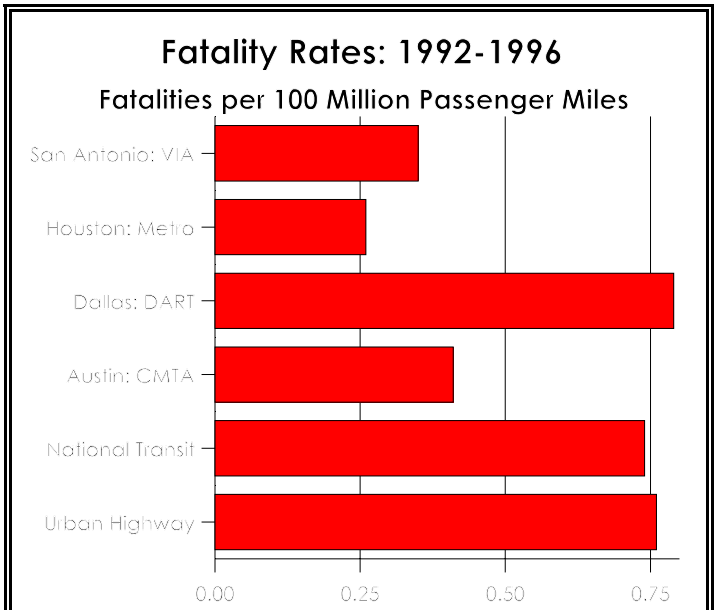


Figure 34
Calculated from National Transit Database.

Financial Performance

Unlike most transit agencies, DART has a formally adopted efficiency improvement program. DART is attempting to improve its unit cost performance by budgeting a 1.5 efficiency improvement each year.

Operating Costs by Mode: DART's operating costs vary substantially by mode. HOV lanes are the most cost effective, at $0.11 per passenger. Light rail and bus are from 25 to 30 times more expensive, while commuter rail is more than 100 times more expensive.[61] Paratransit service is more than 250 times more expensive (Figure 35).

[61] This underestimates the cost differential, since bus, light rail and commuter rail figures are for boardings, which counts transferring passengers at least twice. HOV and paratransit data is for passenger trips (no transfers).

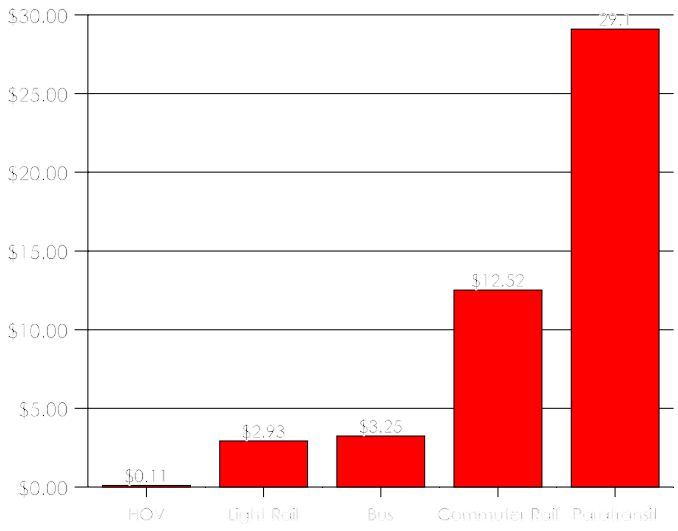


Figure 35
Calculated from DART data.

Fixed Route Operating Costs per Passenger Mile: Fixed route (busway and rail) services account for approximately 90 percent of DART operating costs and the overwhelming majority of DART capital costs. DART's fixed route operating cost[62] per passenger mile was $0.692 in 1996 (labor market adjusted). DART ranked 80th out of the 97 reporting transit agencies operating rail or more than 100 buses (Figure 36 and Table E-11). DART's cost per passenger mile was 165 percent higher than the average for the top five systems that operate buses ($0.261).[63] DART operating costs per passenger mile rose less than inflation from 1996 to 1997, but the improvement is not likely to have resulted in an improved ranking.[64]

[62] Historical capital costs (depreciation) are not readily available from national sources.

[63] Foothill Transit in Los Angeles had the lowest cost per passenger mile. All of its services are competitively contracted.

[64] 1997 operating costs per passenger mile were $0.701.

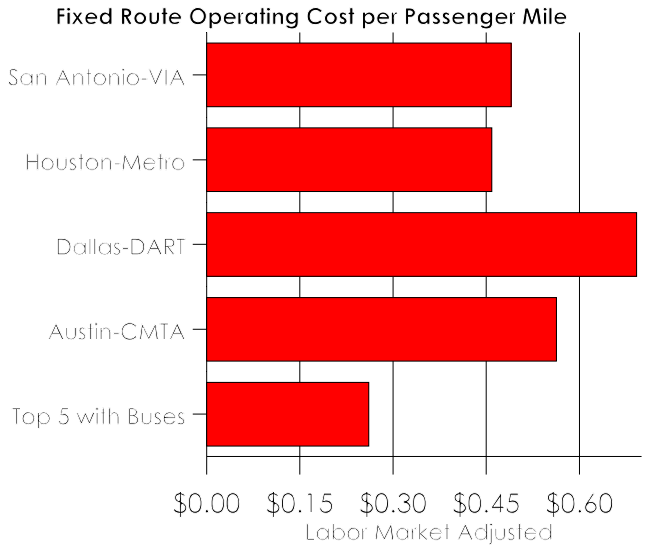


Figure 36
Calculated from National Transit Database.

Bus Operating Cost per Passenger Mile: DART's bus cost per passenger mile was $0.630. DART ranked 67th out of the 86 reporting transit agencies with more than 100 buses (Figure 37 and Table E-12), 134 percent higher than the $2.69 benchmark.

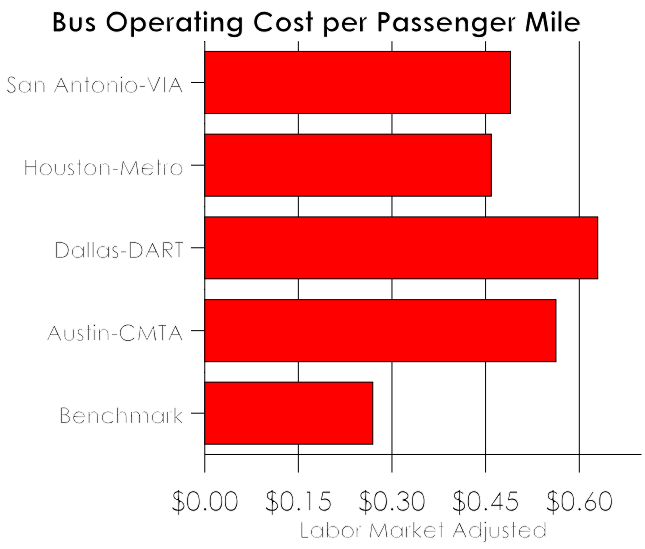


Figure 37
Calculated from National Transit Database

Fixed Route Operating Costs per Passenger Mile: As in the case of costs per passenger mile, DART's fixed route costs per vehicle mile are among the highest in the nation --- at 60 to 80 percent higher than necessary.

Light Rail Operating Cost per Passenger Mile: DART light rail operating costs were exceedingly high during its first fiscal year of operation (1996) and were more than 30 times that of the least costly new light rail system. A better comparison is obtained by contrasting DART 1997 costs (discounted for inflation) with 1996 costs for other transit agencies operating light rail.[65] DART's light rail operating cost per passenger mile was $0.561. DART ranked 13th out of the 19 reporting transit agencies operating light rail (Figure 38 and Table E-13). DART's cost per passenger mile is approximately 200 percent higher than that of the least costly new light rail systems (St. Louis and San Diego).

[65] 1996 is the latest available national data.

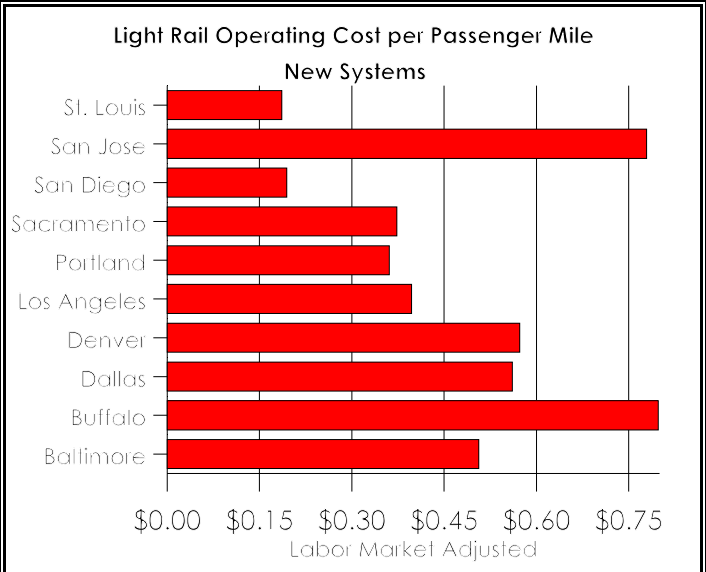


Figure 38
Calculated from National Transit Database

Bus Operating Costs per Vehicle Hour: DART's 1996 bus operating cost per vehicle hour ranked 82nd among 86 transit systems operating more than 100 buses (adjusted for labor market variation).[66] The labor market adjusted cost per vehicle hour was 86.8 percent above the benchmark (calculated from the top five systems), and by far the highest in Texas (Figure 39 and Table E-14). By contrast, DART's cost per vehicle hour is approximately 50 percent higher than that of neighboring Fort Worth. DART costs are above that of such historically high cost systems as the New York City Transit Authority, the Chicago Transit Authority and Boston's MBTA. If DART bus operating costs per vehicle hour were at the national benchmark, $75 million less would have been spent in 1996 to deliver the same level of service. If costs were at the Fort Worth level, $48 million less would have been spent in 1996.

[66] Costs per vehicle hour are largely unrelated to ridership levels. Thus, systems with relatively low costs per passenger mile (such as the New York City Transit Authority) that also have relatively high costs per vehicle hour have significant potential for reducing both cost measures by reducing costs per vehicle hour.

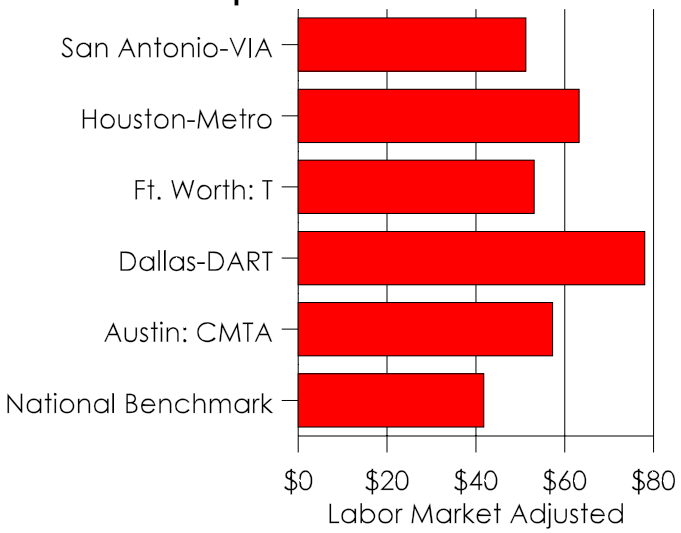


Figure 39
Calculated from National Transit Database.

Bus unit operating costs increased by an inflation adjusted 82.3 percent from 1975 to 1997 (cost per vehicle hour), a 2.8 percent annual rate.[67] This compares to a 1.0 percent annual national transit increase rate[68] and a 1.9 percent annual decline in the competitive market.[69] In 1975, bus operating costs per vehicle hour were just above the 1996 national benchmark of $41.78 (1996$). Over the period since its creation, DART costs have risen steadily, but the largest increases occurred during the period of rapid service expansion following approval of the DART tax. This is a pattern observed in other transit agencies, as services added after large infusions of new tax funding have exhibited higher costs.[70] DART costs per vehicle hour are extraordinarily high.

Light Rail Operating Costs per Vehicle Hour: DART's light rail operating cost per vehicle hour ranked 11th among the 19 reporting transit systems operating light rail (adjusted for labor market variation). The cost per vehicle hour was 62 percent above (Figure 40 and Table E-15) the least costly new light rail system, San Diego. If DART light rail costs per vehicle hour were at the San Diego rate, $9 million less would have been spent in 1997 to deliver the same level of

[67] Calculated from National Transit Database and American Public Transit Association data. 1975 data is for the Dallas Transit System, DART's predecessor.

[68] 1995-1996 annual rate.

[69] 1975-1995 annual rate in the private bus industry.

[70] This dynamic is at odds with the conventional wisdom, which holds that larger organizations produce service at lower unit costs (economies of scale). In transit, the opposite is true. Larger transit agencies tend to have higher unit costs (Internet: *The Urban Transport Fact Book*, www.publicpurpose.com.ut-index.htm).

service.

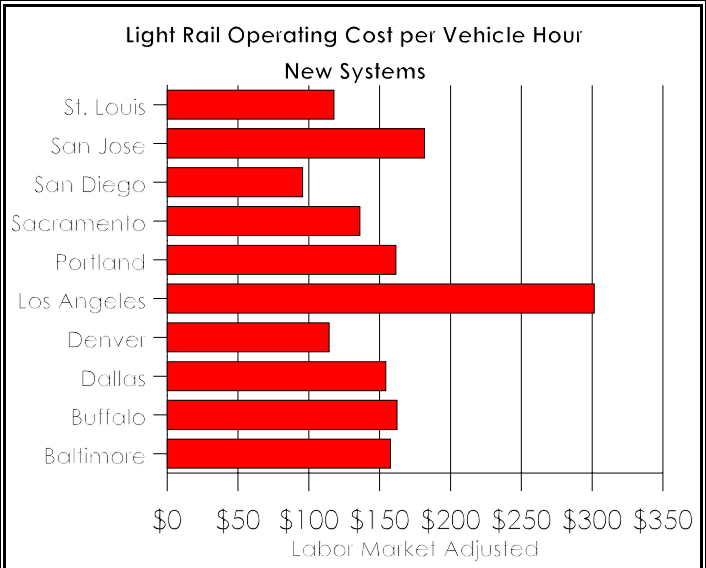


Figure 40
Calculated from National Transit Database.

Fixed Route Costs Compared to San Diego: The extent of fixed route cost escalation is illustrated by comparing Dallas transit costs to those of San Diego from 1979 to 1997.[71] In 1979, the Dallas and San Diego transit systems were of similar size in operating costs, boardings (Figure 41) and service levels. Like Dallas, San Diego opened a light rail system (the first line began operating in 1982).

- Since 1979, the Dallas service level has increased slightly more than that of San Diego, while boardings have increased at a lower level.

- In 1979, Dallas operating costs were approximately $50 million compared to $70 million in San Diego. In 1997 Dallas operating costs were $192 million, double the San Diego figure of $96 million (Figure 42).[72]

As a result, there were significant differences in performance indicators.

- Dallas operating costs per boarding rose 147 percent, while San Diego's *declined* 28 percent (Figure 43).

- Dallas operating costs per service hour rose 58 percent, while San Diego's

[71] Latest information available.

[72] Inflation adjusted bus and light rail operating costs.

declined 35 percent.

San Diego has been a national leader in controlling operating costs. After an expensive labor contract settlement in 1979, San Diego transit officials began a program of gradual conversion to competitive contracting for bus services. This has created a competitive environment in which the former public monopoly (San Diego Transit Corporation) has been required to substantially improve its cost performance to minimize its losses in the regional transit market. This dynamic is called the "ripple effect" (Appendix C: Transit and the Market). San Diego's model culture of cost effectiveness could be replicated in Dallas (See Opportunity: Unit Operating Cost Minimization).

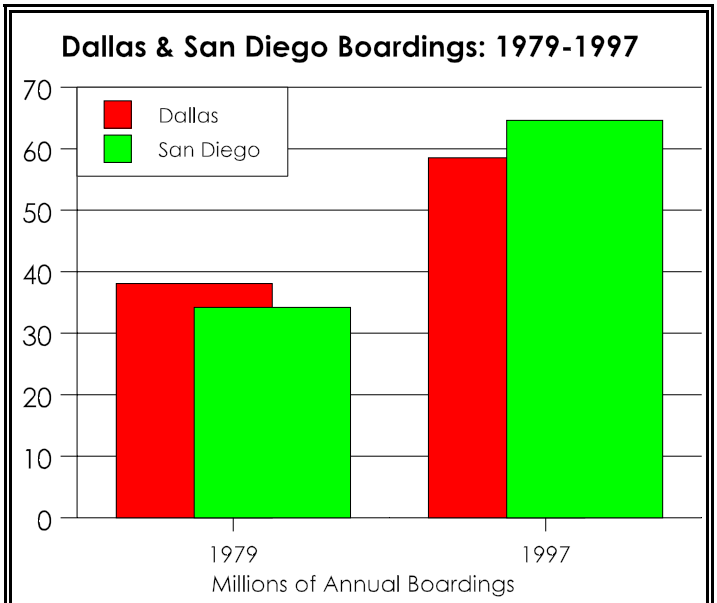


Figure 41
Calculated from National Transit Database and San Diego Metropolitan Development Board data.
Operating Costs Adjusted for Inflation

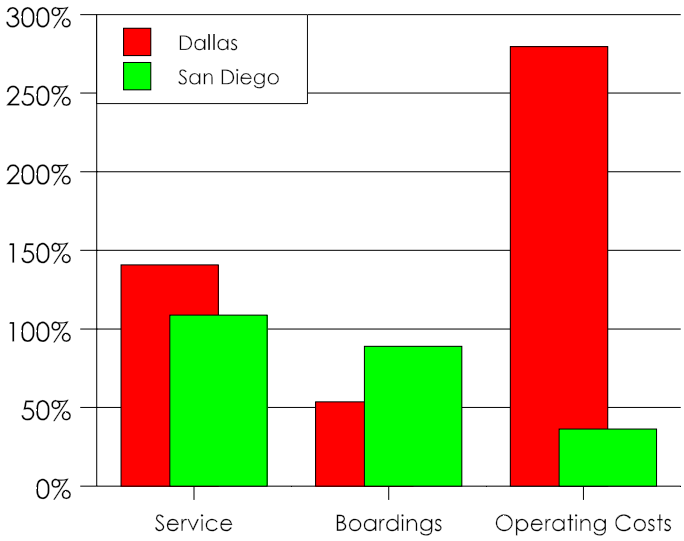


Figure 42
Calculated from National Transit Database and San Diego Metropolitan Development Board data.
Operating Costs Adjusted for Inflation

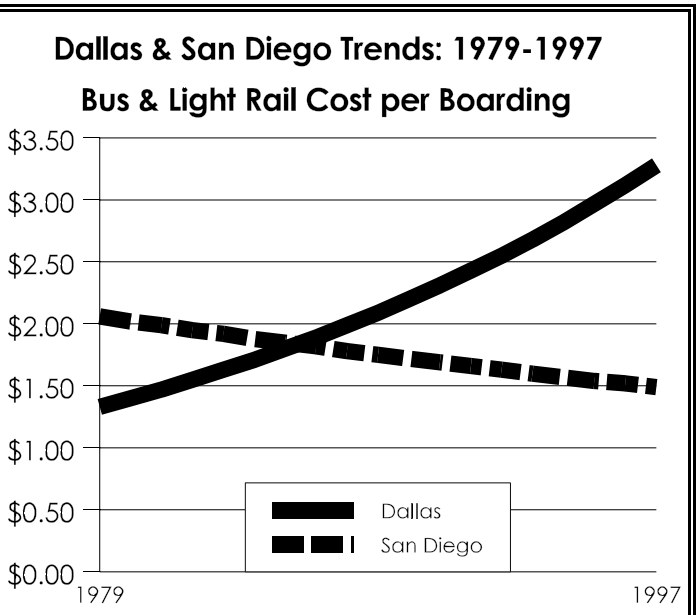


Figure 43
Calculated from National Transit Database and San Diego Metropolitan Development Board data.
Costs Adjusted for Inflation

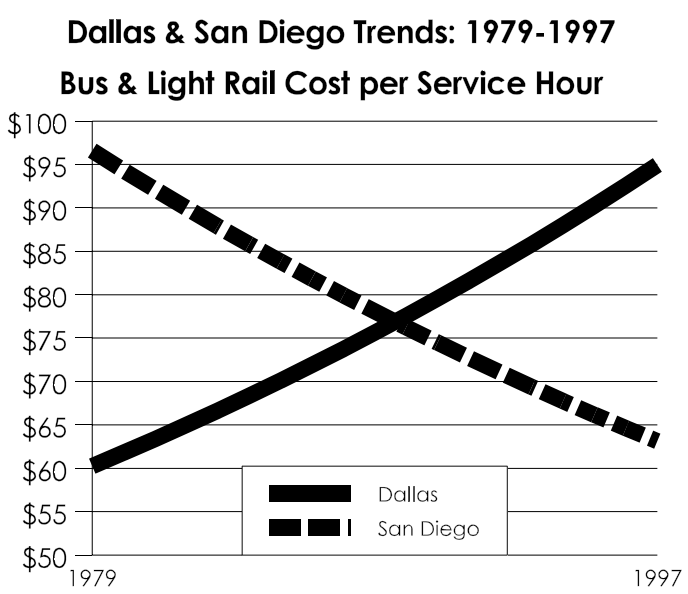


Figure 44
Calculated from National Transit Database and San Diego Metropolitan Development Board data.
Costs Adjusted for Inflation

1999 Fixed Route Operating Costs: The 1996 data used for national comparisons above is the latest available. A review of the 1999 DART budget indicates that fixed route (bus and rail) unit costs[73] have continued to rise at above the inflation rate. This is an indication of the likelihood that DART's financial performance has *worsened* compared to the national benchmark since 1996.

Nonetheless, the present high cost structure has developed over many years and is not a reflection on the present management or board, neither of which were in authority when the greatest cost escalation occurred. However, the present administration has the duty to begin the long trek back toward the competitive cost structure that would place the interests of riders and taxpayers first (See Opportunity: Unit Operating Cost Minimization).

Paratransit Costs: DART competitively contracts its paratransit (dial-a-ride) services. Among the 53 reporting transit agencies operating more than 60 paratransit vehicles, DART ranks 31st in cost per vehicle hour and has 6.6 percent higher costs than the "peer group" of agencies used by the Texas Comptroller to evaluate Capital Metro (Austin) paratransit costs (Figure 45 and Table E-16).[74]

[73] Cost per revenue hour (vehicle hour data not provided).

[74] State Comptroller data inflated to 1996$.

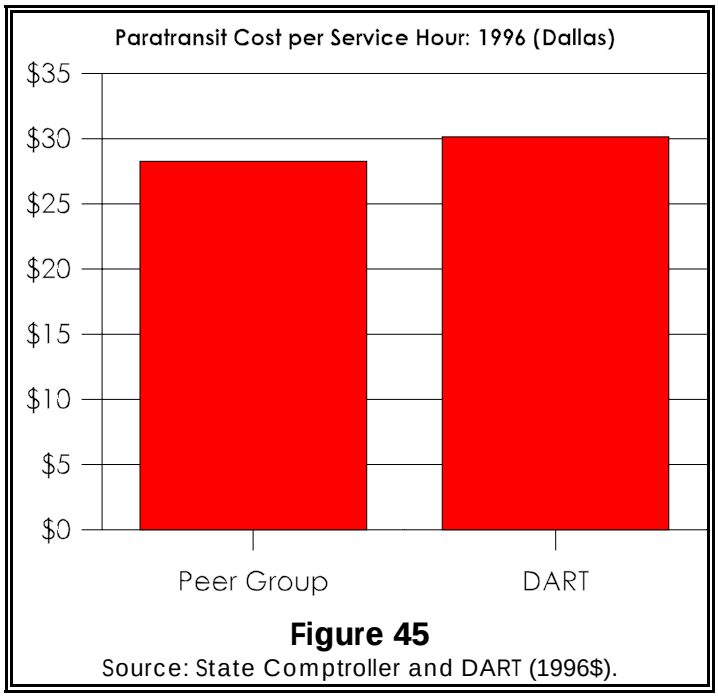


Figure 45
Source: State Comptroller and DART (1996$).

Competitive Contracting

DART was among the first transit agencies in the United States to begin using fixed route competitive contracting on a substantial basis. In 1985, DART competitively contracted a new express bus system and later expanded the program to include suburban bus services. DART competitively contracts 27 percent of bus service. Few U.S. transit agencies competitively contract more bus service, though complete transit systems have or are being converted to competitive contracting in Europe, Australia, South Africa and New Zealand (Appendix C: Transit and the Market). DART competitively contracts all paratransit service.[75] DART also competitively contracts its commuter rail service.

There are indications that DART's competitively contracted bus service is more costly than similar services in other communities. The recently procured Denver service, for example, will be more than 30 percent less expensive per vehicle mile.[76]

One of the reasons for the higher Dallas costs may be that competition for bus

[75] Most paratransit service is contracted in the United States (70 percent according to data in the 1996 National Transit Database).

[76] Analysis of Denver Regional Transportation District information.

contracts has been so limited. The first procurement, in 1984, attracted only one bidder. The 1991 reprocurement also attracted only one bidder. The latter contract was for five years, but has been extended to 2000. This means that the DART competitively contracted service will have been operated by a single company for more than 15 years.[77]

Maintenance: DART ranks as follows in maintenance performance among 76 agencies with 100 or more buses (Figure 46 and Table E-17):

- 47th in cost per vehicle mile, at $0.977, approximately double the benchmark (average of top five industry performers) of $0.487.[78]
- 29th in miles between service interruptions.
- 71st in average bus age (Box 1).

These data indicate the potential for cost savings in maintenance.

BOX 1
MAINTENANCE COSTS AND PERFORMANCE: BUS AGE LESS IMPORTANT THAN POLITICS

It would normally be expected that maintenance costs and the frequency of maintenance related service interruptions would be related to average bus age --- as buses age, costs would rise and the number of service interruptions would increase. This relationship does not exist in public transit. Average bus age is not a reliable predictor of maintenance costs (correlation of 0.043 on 88 observations). Similarly, average bus age is not a reliable predictor of miles between service breakdowns (correlation: 0.0048 on 88 observations).

The lack of these expected relationships reflects the fact that costs and performance in public transit are not driven by competitive (market) forces. Political forces are much more important --- such as the extent to which the political situation has allowed maintenance and support staffs to grow, inefficient work practices to be tolerated and the cost implications of labor bargaining in a

[77] The original bidder was purchased by another company in the early 1990s.

[78] Not labor market adjusted.

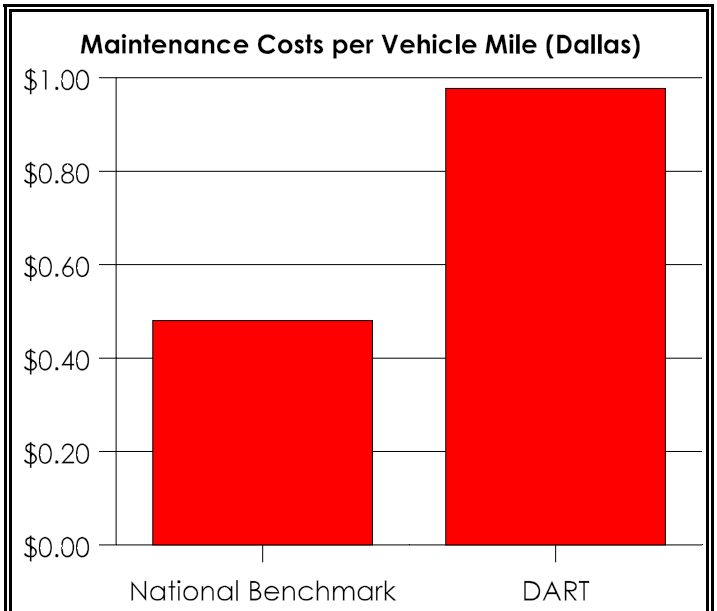


Figure 46
Calculated from National Transit Database.

Administration: There is considerable room for improvement in administration. Among bus operators with more than 100 vehicles, DART ranks as follows (Figure 47 and Table E-18):

- Next to last (79th) out of 80 systems[79] in administrative hours per vehicle hour at 0.442, 375 percent above the benchmark (average of top five industry performers) of 0.093.

- Next to last (79th) out of 80 systems in thousands of administrative hours per boarding at 16.71, 600 percent above the benchmark (average of top five industry performers) of 2.38.

[79] 80 systems reported administrative information.

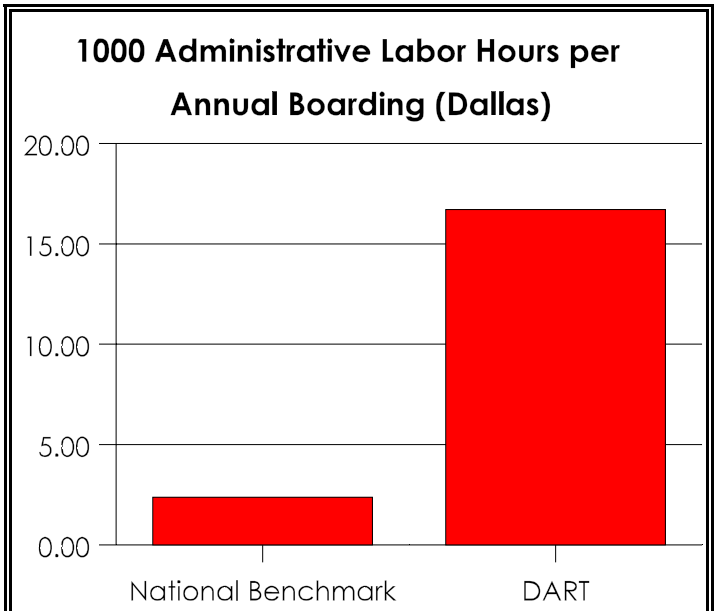


Figure 47
Calculated from National Transit Database.

Fares and Subsidies: DART fares covered 12.5 percent of its operating costs in 1996 --- 81st among the 83 reporting transit agencies with at least 100 buses.[80] DART's fare recovery ratio is nearly 60 percent lower than the average for these operators. The average fare ratio among the top five operators (55.4 percent) is 4.4 times as high as that of DART (Figure 48 and Table E-19). DART's $1.00 base fare is at approximately the national average.

DART had a subsidy ratio of 87.0 percent, 81st highest among the 83 reporting transit agencies.[81] DART's subsidy ratio is 30 percent higher than the average for these systems, and 2.2 times that of the top five transit agencies (Figure 49 and Table E-20).[82]

[80] Fare ratio calculation includes all transit modes (bus and rail).

[81] The fare ratios and subsidy ratios do not necessarily add up to 100 percent, because non-transportation revenues, such as advertising revenues, are neither fares nor subsidies.

[82] Fare ratios of above 100 percent are achieved by private companies operating more than 550 express buses into Manhattan (New York). By comparison, commuter rail systems in the New York area tend to have operating ratios averaging approximately 60 percent (analysis of National Transit Database).

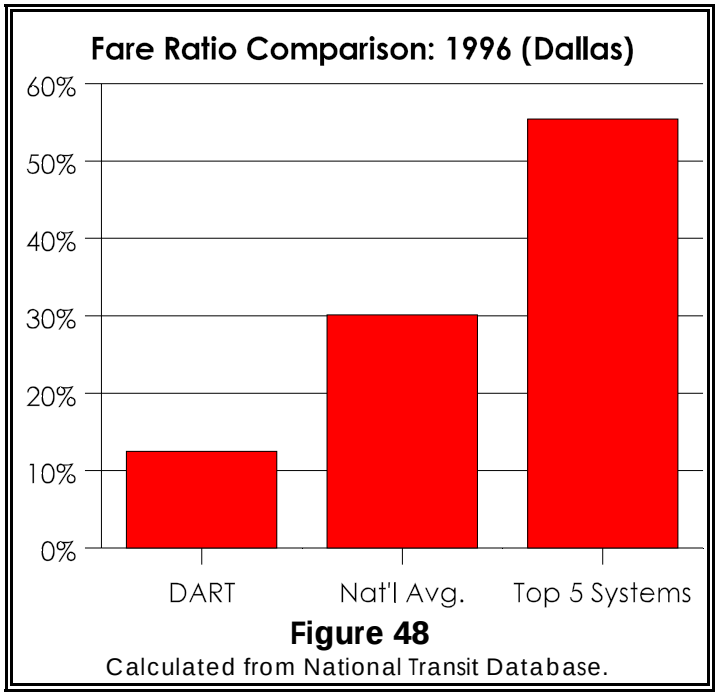


Figure 48
Calculated from National Transit Database.

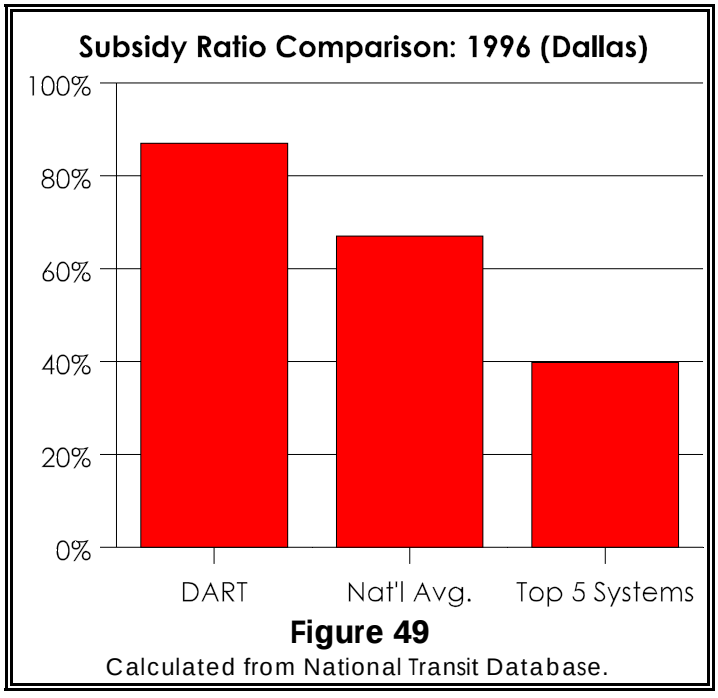


Figure 49
Calculated from National Transit Database.

Rapid Transit

According to the American Public Transit Association, rapid transit is "rail or motorbus service operating completely separate from all modes of transportation on an exclusive right-of-way."[83] Rapid transit has the potential of attracting automobile users because of its higher speeds compared to non-grade separated modes such as light rail and buses on surface streets.

DART's system relies on highways (especially HOV lanes) and commuter rail[84] for rapid transit. Highway applications include two modes – express buses and car pools.

- The express buses operate on regular freeway lanes and HOV lanes, while DART includes car pool ridership on HOV lanes in its ridership.[85] The express bus system largely serves downtown, though unlike many express bus systems, operates in both directions and all day (instead of just one direction during peak hours). Because transfers are required to use the outbound service from most parts of the service area, the reverse commute service provided by the express bus system attracts few commuters from automobiles. However, the reverse commute service does make some suburban jobs accessible to inner city commuters who do not have access to automobiles.

- Car pools represent approximately one third of DART's ridership. DART's HOV lanes provide expedited travel for users. Average operating speeds have doubled --- from 28 miles per hour before implementation to 56 miles per hour. This has resulted in a travel time savings of 12 minutes daily for the average HOV user. The diversion of car pools to HOV lanes has improved operating speeds on general purpose lanes by five percent.[86] It is projected that HOV usage will increase to 268,000 passengers daily by 2010,[87] which will exceed combined DART rail and bus services by more

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[83] American Public Transit Association, "Glossary of Transit Terminology," Internet: www.apta.com.

[84] While commuter rail is not technically rapid transit because it is not fully grade separated, its sparse station spacing permits it to operate at speeds generally faster than that of grade separated rapid transit. Door-to-door travel times tend to be slower, however, because it is often necessary to transfer to another mode of transport (such as a shuttle bus or light rail line) to complete the trip in the downtown area.

[85] In most metropolitan areas, car pool passenger volumes are not included in transit ridership statistics. As a result, care should be exercised in comparing DART ridership to ridership in other metropolitan areas.

[86] Texas Transportation Institute, *Effectiveness of Dallas Area HOV Lanes*.

[87] DART *Transit System Plan*, November 9, 1995.

than 20 percent.[88]

DART has opened a 10 mile commuter rail line, which will eventually be extended to Fort Worth and to Dallas-Fort Worth International Airport. Currently 2,100 daily riders use the line, ranking last nationally among new rail systems per downtown oriented corridor (Figure 50 and Table E-21). The commuter rail line averages 33.3 miles per hour, the slowest among new commuter rail operators nationally. Washington's Virginia Railway Express is second slowest, at 34.5 miles per hour.[89] While commuter rail's operating speed is competitive with that of the automobile, its failure to provide door-to-door transportation to all but a few locations limits its ability to attract automobile drivers.

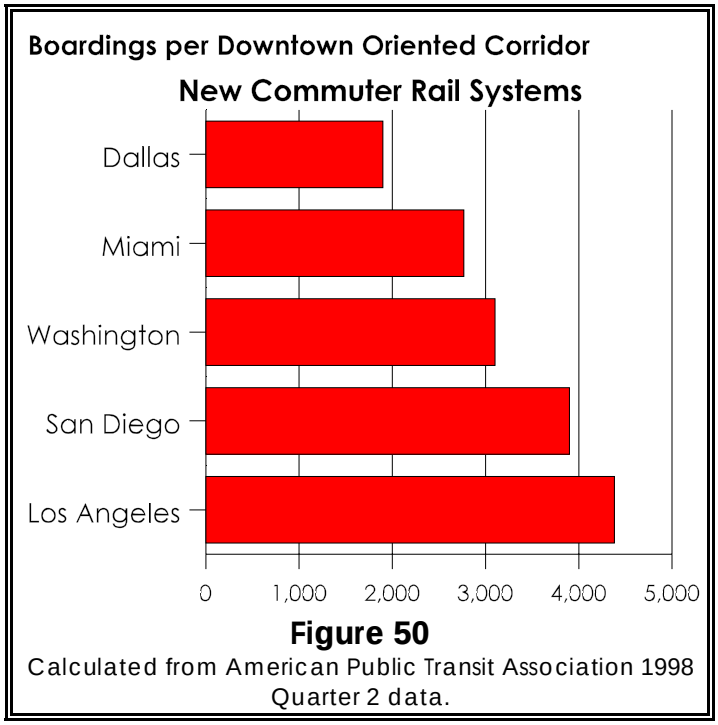

Figure 50
Calculated from American Public Transit Association 1998 Quarter 2 data.

Light Rail

The 1983 campaign for the DART tax referendum made impressive claims to the voters. Voters were told that DART trains were needed to reduce traffic congestion, and that within 25 years:

- 160 miles (14 routes) of rail would be built, including a downtown subway.

[88] According to DART *Transit System Plan* data.

[89] Calculated from DART data and National Transit Database.

All of this was to be built for $17.8 million per mile.[90]

- 500,000 daily riders would be carried on DART buses and trains.
- Over 50 percent of downtown commuters would ride DART services.[91]

As has become typical in transit,[92] the results fell far short of the promises.

- The rail system was scaled back by more than two-thirds, even though the tax rate remained at the level that was to finance the 160 mile system. Costs were grossly underestimated in the plans presented to taxpayers, with costs per mile for the first 20 miles approaching $45 million, more than a 60 percent increase (inflation adjusted).[93]
- Present projections indicate that in the *entire* Dallas-Fort Worth area (not the DART service area), transit boardings will be 376,900[94] in 2020.
- And, for DART to achieve a 50 percent downtown market share was simply a specious claim --- only New York, Chicago and San Francisco achieve such a high downtown transit market share, and in each of those downtown areas transit market share is falling. To achieve a 50 percent market share, downtown Dallas transit commuting would need to quadruple --- a phenomenon that has not occurred in any city since horse drawn omnibuses replaced walking in the first half of the 19th century.

Voters were also told that without DART, Dallas traffic congestion would soon reach Houston levels and that traffic congestion would get increasingly worse without DART. In fact, with DART, traffic congestion in Dallas now equals that of Houston (see above). Traffic congestion has become considerably worse in Dallas as little of the travel growth since before DART's establishment has been

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90 *Vote DART. It's the Best Way to Go*, 1983 campaign brochure produced by the Transportation Task Force.

91 *We Need DART Now Because We Can't Afford to Delay Any Longer*, advertisement in *The Dallas Morning News*, August 3, 1983.

92 Rail transit systems usually cost much more than originally estimated, carry fewer riders than projected and cost more to operate. See Don Pickrell, *Urban Rail Transit Projects: Forecast Versus Actual Ridership and Costs,* United States Department of Transportation, Urban Mass Transportation Administration, October 1989.

93 Things could be worse. Like Dallas, Los Angeles over promised on its transit expansion plans. A 1980 tax initiative was to have built 11 urban rail lines. Because costs were higher than planned, the tax was doubled in 1990. Then, the agency ran out of money in 1998 and suspended rail development following completion of the *third* line. Annual debt service will soon rise to $400 million annually and transit ridership is down more than 25 percent since 1985.

94 *Mobility 2020.*

on transit (Figure 51). According to the *Mobility 2020* projections, even further expansion of the rail system will have an imperceivable impact on traffic --- all of the anticipated transit ridership increase over the next 29 years is nullified by less than four months of street and freeway traffic growth.[95]

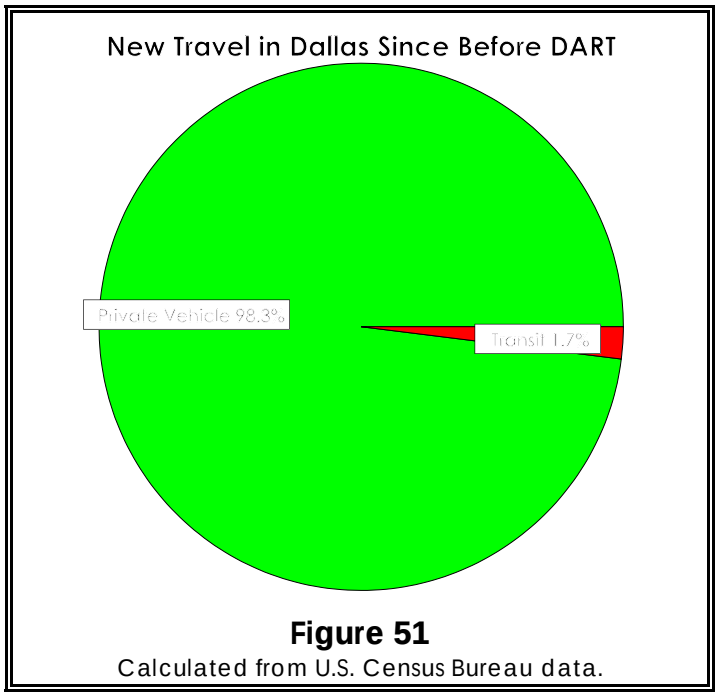

Figure 51
Calculated from U.S. Census Bureau data.

Since the DART tax was enacted, approximately $3.5 billion has been collected. Ridership has increased 63 percent, operating revenues (principally fares) have declined eight percent,[96] while the annual transit budget has expanded by nearly 700 percent (Table 2).

[95] Estimated from *Mobility 2020*, Texas Transportation Institute, Federal Highway Administration and DART data.

[96] Inflation adjusted.

TABLE 2 BEFORE DART AND 1999: PASSENGER AND FINANCIAL INDICATORS			
	Boardings (Millions)	**Spending (Millions) 1999$**	**Operating Revenues (Millions) 1999$**
1983	37.4	$82	$37.0
1999 Budget	61.0	$655	$34.0
Change	63.1%	699.0%	-8.2%
Operating revenues include all non-tax revenues, including fares and advertising revenues.			

DART has opened 20 miles of the scaled back 53 mile light rail system. The system consists of three downtown oriented corridors and carries 40,000 daily boardings. The light rail system ranks 12th in boardings per downtown oriented corridor among the 20 new rail systems and 7th out of the 10 new light rail systems (Figure 52 and Table E-21). The most heavily used new light rail systems carry more than twice the DART volume per downtown oriented corridor (Portland and San Diego).

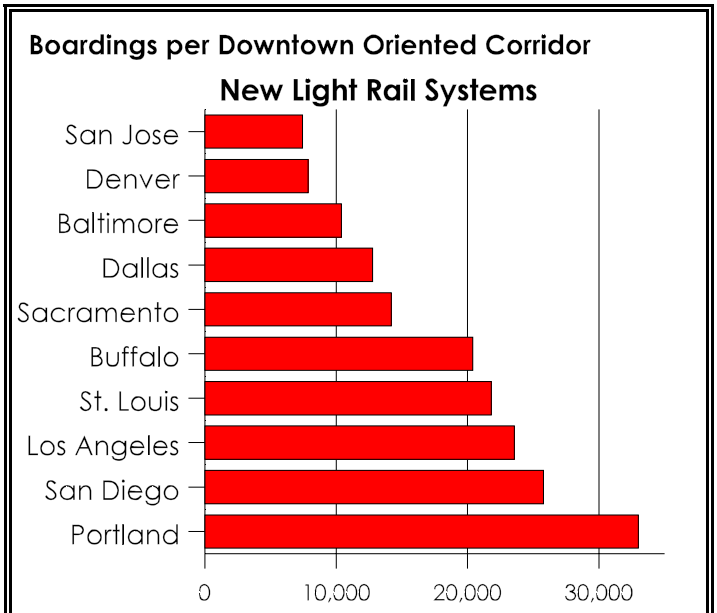

Figure 52
Calculated from American Public Transit Association 1998 Quarter 2 data.

Speed: DART light rail services average 14.1 miles per hour.[97] This is slower than

[97] Average speed per revenue hour, including operation on HOV lanes and surface streets. Calculated from DART data.

the 17.2 mile per hour average speed of other new light rail systems. DART buses also average 14.1 miles per hour. Light rail average speeds are approximately half that of autos on arterial streets (surface streets) during peak hours and one-third the average operating speed of freeways during peak hour (Figure 53).[98]

By comparison, Dallas peak period arterial travel speeds, at 29 miles per hour (automobile), are double that of light rail, but slower than commuter rail. Average peak hour freeway speeds (44 miles per hour) are triple that of light rail and nearly one-third faster than commuter rail (Figure 54).

Because of its slow operating speed, DART's light rail provides no time savings relative to automobiles. Moreover, time savings with respect to buses are limited by the fact that light rail operates at virtually the same speed as DART's buses.

Rail and busways (including high occupancy vehicle lanes, or "HOV" lanes) are classified as "fixed guideways." In 1996 Dallas ranked 16th nationally in one-way fixed guideway (rail and busway) mileage, 64 percent less than Houston (Table E-22).

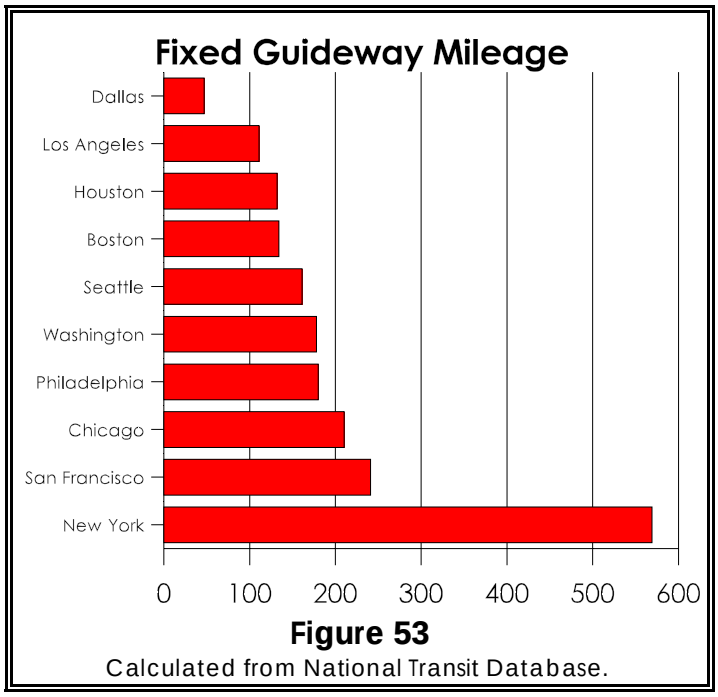

Figure 53
Calculated from National Transit Database.

DART's light rail system ranks 18th in speed among the 20 transit agencies reporting fixed guideway speed information. Atlanta's heavy rail system operates almost twice as fast, while Houston's busway system operates 84 percent faster (Figure 55 and Table E-23).

[98] Roadway operating speeds from Texas Transportation Institute.

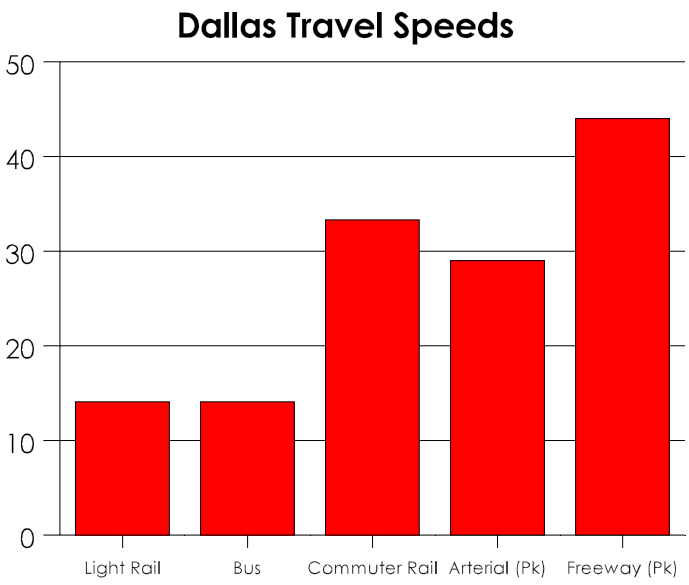

Figure 54
Texas Transportation Institute data and Calculated from National Transit Database.

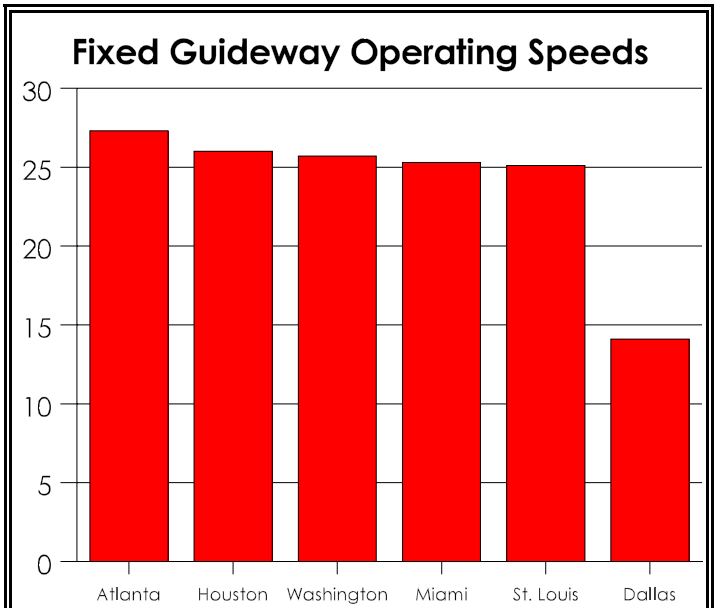

Figure 55
Calculated from National Transit Database.

Light Rail and the DART Ridership Increase: DART's 3.0 percent boarding increase from 1991 has been achieved at a considerable price. The operating cost per each new boarding ($15.99) has been more than five times the average 1991

cost per boarding (Figure 56).[99] Moreover, DART's ridership increase has been much more costly than a similar ridership increase at Houston Metro:

- By 1997, Dallas (DART) boardings had increased 7.7 million since the year before light rail was opened[100] (1995). At the same time, operating costs rose nearly $42 million (inflation adjusted), for a cost per new boarding of $5.43. This represents an annual cost per new commuter of nearly $2,500.[101]

- Over the same period, Houston Metro experienced a 6.8 million increase in boardings, while operating costs rose $9.3 million, for a cost per new boarding of $1.37 (Figure 57).[102] This represents an annual cost per new commuter of $600.

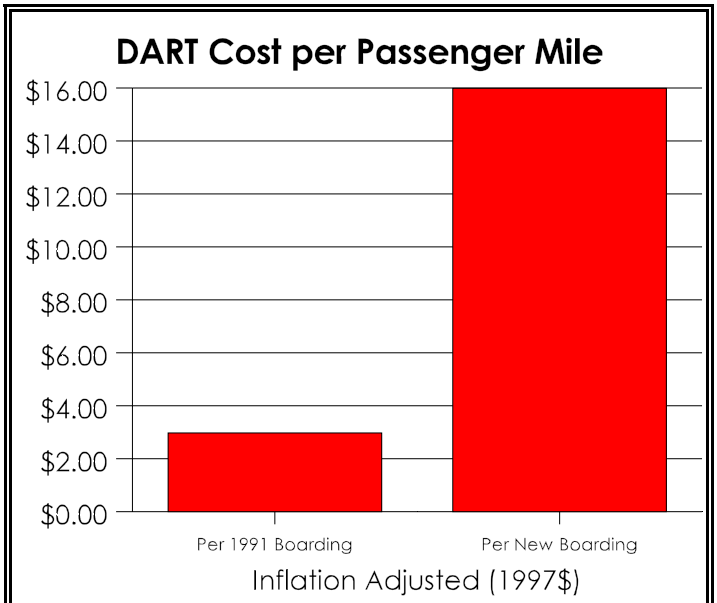

Figure 56
Calculated from National Transit Database.

99 Inclusion of capital costs would increase this gap substantially. It is estimated that DART light rail capital costs are 2.5 times operating costs.

100 Commuter rail was opened in 1997.

101 Assumes two work trips daily, 225 days per year.

102 Houston's cost advantage is probably greater. The addition of rail systems tends to artificially increase boardings by requiring new transfers between bus and rail for former bus riders.

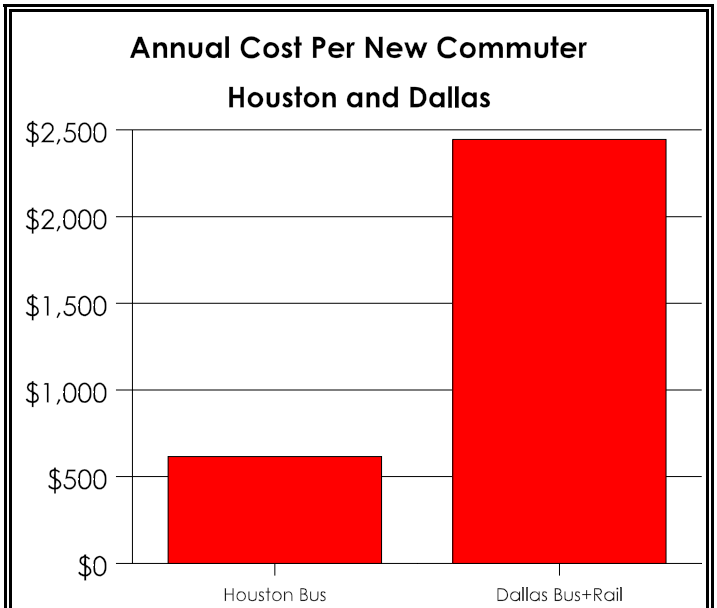

Figure 57
Calculated from National Transit Database.

Moreover, it is possible that the ridership increase attributable to light rail is less significant than is immediately apparent.

- Addition of light rail has increased transfers, resulting in an artificial increase in DART ridership. A number of bus routes that used to operate all the way to downtown are now truncated at light rail stations, where passengers are forced to transfer. This has increased boardings, without increasing the actual number of people taking transit trips.

- New light rail feeder bus routes were established. Any ridership increase attributable to these routes might have been obtained by establishing feeder routes to the previous downtown oriented bus routes.

- DART charges only half fare on light rail services in the downtown area. This is likely to have increased ridership, especially during mid-day (such as for lunch trips). Any such ridership increase is not likely to have materially impacted traffic.

Non-transportation benefits: David Gunn, former general manager of the New York City Transit Authority, the Toronto Transit Commission, Philadelphia's SEPTA and Washington Metro has noted that urban rail is being built for reasons having nothing to do with transportation. His characterization of the trend toward urban rail is stated in terms of worship:

... today subways and light rail have become icons of development.[103]

The DART light rail system has been credited with non-transportation benefits, such as an improved civic "psyche" and the generation of economic development. This issue is discussed in Appendices B and D. Light rail, however, is precluded from having a material impact upon traffic congestion, which was its justification, by its slow speed and limited geographical access.

Long Term Transit Planning

DART plans to expand the 20 mile light rail system to 53 miles and to complete the commuter rail line to Fort Worth and Dallas-Fort Worth International Airport. The adopted regional transportation plan, *Mobility 2020*, anticipates a significant additional expansion of the rail system. The plan also includes construction of nearly 200 lane miles of high occupancy vehicle lanes, a large percentage of which would be one-way reversible.[104] An additional 200 lane miles of freeways would also be built.

Through 2020, $32 billion would be spent under *Mobility 2020*, more than $20 billion on streets and freeways, $10.5 billion on transit, $1.5 billion on high occupancy vehicle lanes and $400 million on bicycle and pedestrian facilities (Figure 58).

[103] Robert Koch, "Gunn Leaves with Both Barrels Blazing," *NovaeResUrbis*, November 2, 1998.

[104] Morning peak hour operation would be inbound toward Dallas, and evening peak hour operation would be outbound from Dallas.

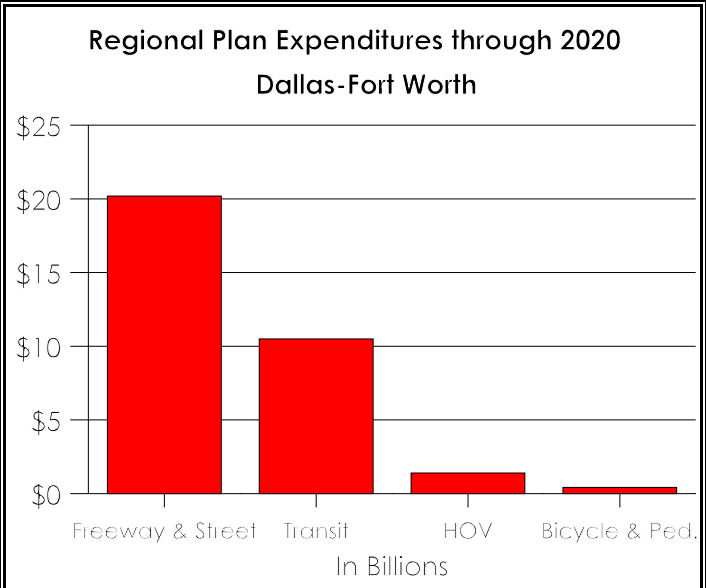

Figure 58
Assumes all new transit ridership is rail.
Estimated from NCTCOG data.

Despite the considerable expenditure on transit, there would be virtually no change in transit's market share by 2020 according to *Mobility 2020* projections.

- Per point of market share, HOV lane costs would be more than three times as much as freeway and street expenditures. Transit expenditures would be 75 times that of streets and highways per point of market share and 22 times that of HOV lanes (Figure 59).[105]

- High occupancy vehicle lane capital expenditures would be 2.2 times that of freeway expenditures per new passenger mile. Transit expenditures would be more than 30 times greater than that of streets and highways and 14 times greater than that of HOV lanes (Figure 60).

[105] All congestion management costs allocated to streets and highways. Street and highway maintenance and operating costs allocated based upon lane miles to HOV lanes and freeways/streets.

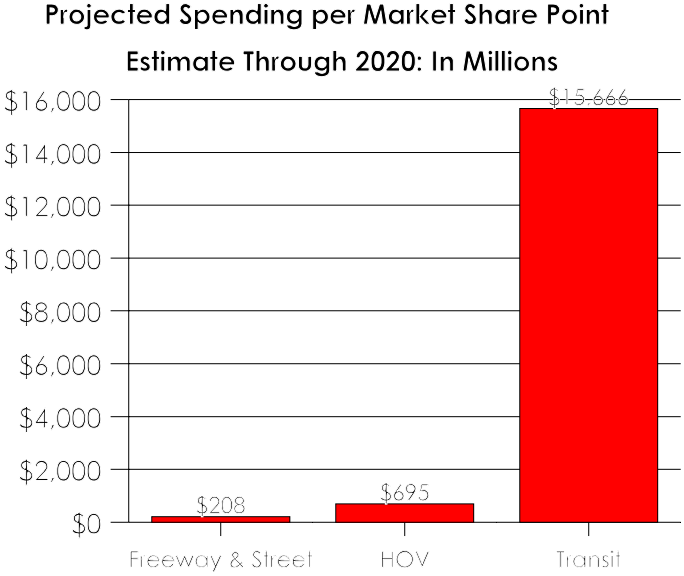

Figure 59
Estimated from NCTCOG data.

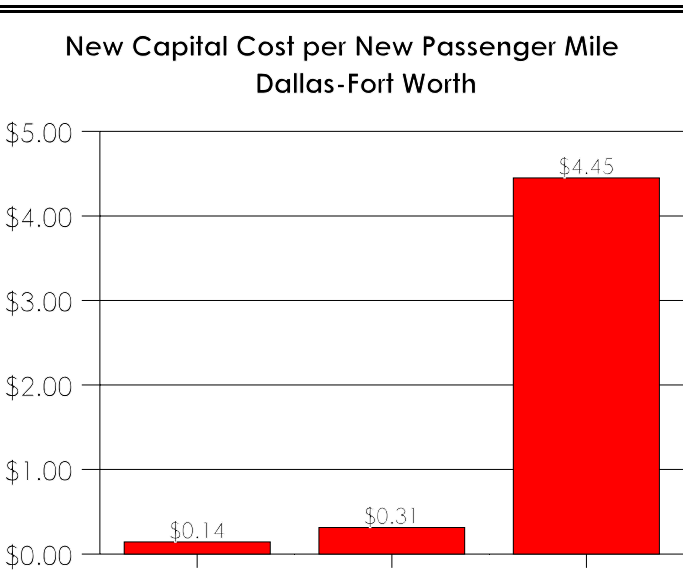

Figure 60
Assumes all new transit ridership is rail.
Estimated from NCTCOG data.

Mobility 2020 would spend 2.5 times as much to build rail extensions as to build HOV lanes, despite the fact that HOV usage will be greater than total transit ridership, *including rail*. Rail's inherent disadvantages preclude its being an

effective regional transportation strategy.[106]

- **Excessive cost:** Generally, rail lines are five times as costly to build as bus programs providing the same level of service.[107] U.S. government research has shown that where bus service is equivalent to rail service, passengers have no preference for rail (or bus).[108] Of the seven metropolitan areas that increased their per capita ridership by more than 20 percent since 1980, six relied on expanded bus service. The seventh ranking metropolitan area, San Diego, relied on both light rail and expanded bus service (Table E-5). Moreover, light rail systems have proven to be excessively costly. The cost per attracted automobile driver averages more than $18,500 annually --- or nearly $750,000 over a 40 year career.[109] This is considerably more than would be required to lease each attracted automobile driver a luxury automobile in perpetuity (retail prices of $30,000 to $65,000).[110] It is 80 percent more than the average household expenditure on housing[111] (Figure 61).

[106] Despite this, there is a strong national regional planning movement, the "new urbanism" that views light rail as a critical tactic in a strategy to control "urban sprawl."

[107] John Kain, Ross Gittell, Amrita Daniere, Tsur Summerville and Liu Zhi, *Increasing the Productivity of the Nation's Urban Transportation Infrastructure*, United States Department of Transportation Federal Transit Administration, January 1992.

[108] Moshe Ben-Akiva, *Ridership Attraction of Rail Compared with Bus* (U.S. Department of Transportation, 1991).

[109] Calculated from U.S. Department of Transportation data. Assumes two way commute 225 days annually and that 60 percent of new riders are automobile commuters.

[110] Includes down payment, taxes, license fees and monthly lease payments.

[111] Calculated from U.S. Department of Labor Bureau of Labor Statistics data.

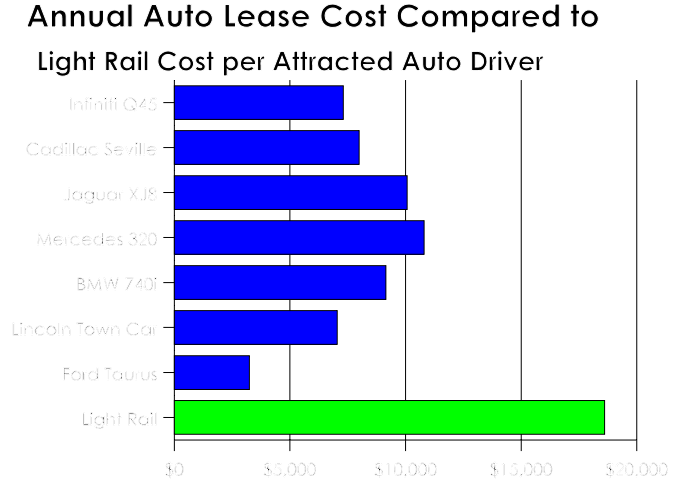

Figure 61
Estimated from U.S. Department of Transportation data and classified advertisements for new automobiles.

- **Not a regional strategy:** Rail is a downtown strategy rather than a regional strategy. Downtown is already very well served by transit. The potential for increasing transit's market share in the downtown area is limited. Most new employment is expected to be created *outside* downtown. A rail system would thus provide little additional benefit, while consuming funding that could be better spent in areas where there will be a substantial increase in travel demand.

Reducing Traffic Congestion: The Record: New U.S. light rail lines carry only modest volumes. In no case has light rail attracted enough drivers out of their cars to materially reduce traffic congestion (Figure 62).

- On average new U.S. light rail lines carry less than 80 percent volume than a single freeway lane couplet (2 lanes of freeway, one operating in each direction).

- St. Louis has the highest light rail volume, at 66 percent below a local freeway lane couplet.

- Portland's MAX carries 81 percent less than a single freeway lane couplet.

- San Jose has the lowest light rail volume at 91 percent less than a freeway lane couplet.

Light rail volumes are also lower than the average two way arterial (major surface street) lane couplet (Figure 63).

- On average new U.S. light rail lines carry 50 percent less volume than a single arterial lane couplet with traffic signals (2 lanes, one operating in each direction).
- San Diego has the highest light rail volume, at 8 percent below that of a local arterial lane couplet.
- Portland's MAX carries 50 percent less volume than a single arterial lane couplet.
- San Jose has the lowest light rail volume, at 77 percent below an arterial lane couplet.

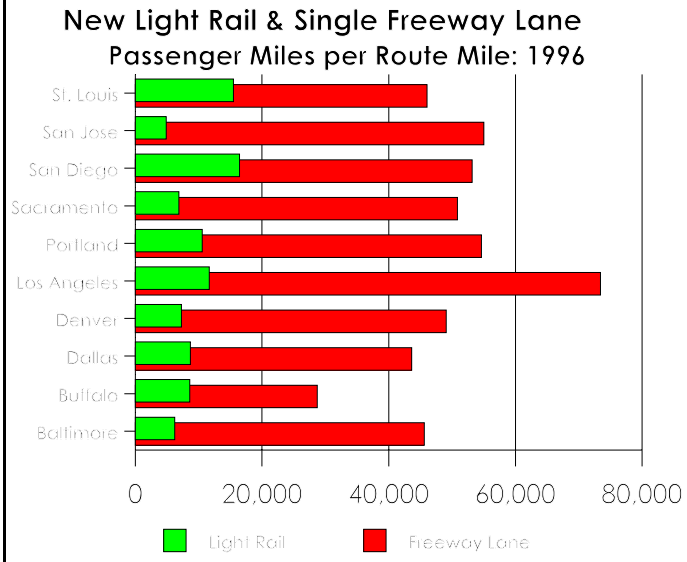

Figure 62

Estimated from FHWA, Texas Transportation Institute and National Transit Database information.

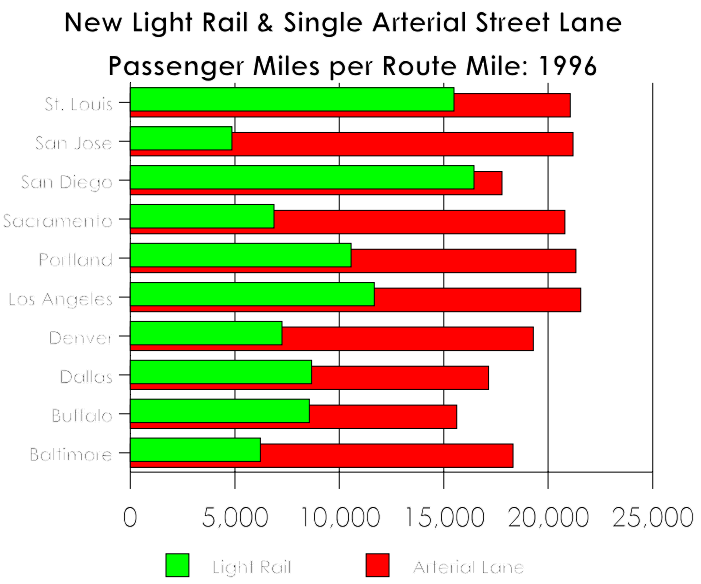

Figure 63

Estimated from FHWA, Texas Transportation Institute and National Transit Database information.

It is sometimes suggested that light rail is not intended to reduce traffic congestion so much as it is intended to reduce future traffic congestion growth. A related argument is that light rail will be available to respond to the more intense traffic congestion that is expected in the future. Neither of these arguments, however, is compelling because virtually all projections around the nation indicate that commercial and residential development will continue to be dominated by the suburban areas that cannot be served by light rail. Even in downtowns with light rail, transit encounters significant difficulty in maintaining its market share. In the past two years, transit's overall work trip market share in downtown St. Louis has dropped by more than one third, and light rail's market share has dropped by 10 percent.[112] Moreover, a Mississippi River bridge repair that doubled commuting times failed to divert a significant number of drivers to St. Louis' light rail line (below).

Peak Hour Volumes: Even during peak travel hours light rail carries comparatively few riders compared to freeway lanes, though data is not generally available.

- In Portland, inbound (toward downtown) light rail volume averages approximately 1,100 per hour during the 6:00 a.m. to 9:00 a.m. peak

[112] Charlene Proust, "Downtown gains workers and businesses, survey shows," *St. Louis Post-Dispatch*, 4 March 1999. This survey further indicated that all downtown employment growth was outside the core of the downtown area, where light rail is most effective.

period. By comparison, each lane of the adjacent Banfield Freeway (Interstate 84) carries approximately 2,600 people per hour --- nearly 2.5 times the volume of the light rail line. In the outbound direction, each freeway lane carries 1,500 persons hourly, 28 times the light rail averages of 55 passengers during the same period (Figure 64). Overall, during the morning peak period, the freeway carries more than 10 times the volume of the light rail line.[113]

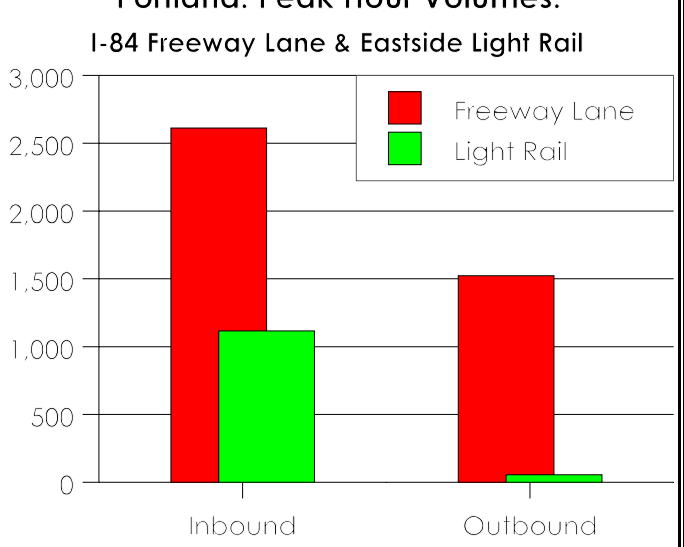

Figure 64
Calculated from Oregon Transportation Institute data.

- In St. Louis, inbound peak hour light rail ridership is approximately 60 percent less than the capacity of a single freeway lane. When an approach to the bridge was closed for weeks due to accident damage, many commuters experienced 100 percent increases in their travel times. Yet light rail's peak volume remained at least 40 percent below that of a single freeway lane.[114]

Theoretical and Practical Capacity: These findings appear to contradict the often cited claim that a light rail line has the same person carrying capacity as up to six freeway lanes. Yet U.S. transit agencies do not even provide a sufficient amount of service to carry such a large number of passengers.

For example, St. Louis, with one of the nation's most intensively used new light

[113] Oregon Transportation Institute, *Max Versus Banfield Freeway: A Comparison of Actual Passenger Usage*, Internet: www.hevanet.com/oti/MVFE.htm., based upon Oregon Department of Transportation and Tri-County Metropolitan Transit District data, 1994.

[114] Ellen Perlman, "The Little Engine that Might," *Governing Magazine* August 1998. Highway volumes from the Missouri Department of Transportation.

rail lines, provides seating capacity for fewer than 900 passengers each peak hour --- one-third the capacity of a freeway lane. With a "crush" load of standing passengers, the St. Louis line could achieve a passenger volume of nearly 2,000, still 25 percent below a freeway lane's capacity. Moreover, it is apparent that the St. Louis line has not reduced traffic congestion. Traffic on the adjacent Mississippi River Bridge (I-55/64/70) has increased by more than 20 percent since before the light rail line opened. Despite being able to save between $4.00 and $11.00 in parking charges by taking light rail, the vast majority of commuters continue to drive.

It is theoretically possible [115] for light rail to carry the volume of six freeway lanes,[116] but it would require service levels and passenger demand far above present levels. Like Interstate 10 between Fort Stockton and Van Horn, new light rail systems have the capacity to carry much more volume. Interstate 10 does not because there is insufficient travel demand in that area. Light rail does not because there is little demand for a mode of transport much slower than the automobile on which one may stand for a major portion of the trip.

Alternative Transportation: Some advocates contend that, even though urban rail does not reduce traffic congestion or its growth, it is important to provide an alternative for people so inclined to use it. There are significant problems with the goal of alternative transportation and light rail:

- Urban rail can serve only a very limited market. No new light rail system carries even one percent of travel in any metropolitan area.

- Urban rail primarily serves downtown, which is the only destination to which there is already a practical transportation alternative --- transit buses.

Urban rail provides no alternative to the overwhelming majority of urban travelers whose trips do not begin or end in downtown. Busways and HOV lanes, on the other hand, can provide alternatives to virtually all people using the freeway system throughout the urban area.[117]

Why New Urban Rail Attracts so Few Automobile Drivers: New urban rail systems have failed to reduce traffic congestion for two fundamental reasons (Box 2).

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[115] Similarly, it is possible to rebuild the Texas Stadium to seat 1,000,000 rather than 65,000 spectators. Like light rail, however, rarely if ever would demand approach the capacity.

[116] Curitiba, Brazil has two non-grade separated busways that carry a peak hour volume equal to five freeway lanes in a single direction.

[117] In the nation's 50 largest urbanized areas, nearly 40 percent of travel is on the freeway system.

- **Most locations in the urban area are not served:** In new rail cities, more than 99.2 percent of the urbanized area is beyond the typical maximum one-quarter mile walking distance from a station (Figure 65).[118] As a result, the overwhelming majority of jobs cannot be reached by urban rail. Nearly 99 percent of the DART service area will be beyond walking distance from the eventual 53 mile light rail system.

- **Slow speed:** Even in the few corridors served by new light rail systems, it provides no speed advantage compared to highway alternatives (Figure 66). New light rail systems average 17.2 miles per hour, and the fastest at-grade[119] system operates at 18.2 miles per hour.[120] While this is faster than the bus average of 12.8 mile per hour, light rail remains considerably slower than other modes. It is slower than express bus systems, which operate at approximately 24 miles per hour.[121] By comparison, the average automobile commuting speed is more than 30 miles per hour (nearly double the new light rail operating speed).[122]

Because of these factors, travel surveys generally show that the majority of new urban rail riders are former bus riders,[123] whose bus service no longer takes them directly to their destinations (by virtue of forced transfers).[124] In fact, light rail feasibility studies invariably come to the same conclusion --- that rail makes little difference in reducing either traffic congestion or its growth. However, when proposals to build rail are marketed, reduction of traffic congestion is usually the

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118 Calculated from 1996 National Transit Database and Texas Transportation Institute data.

119 At-grade systems cross major arterials at street level, requiring crossing gates, and causing roadway traffic to stop. Grade separated systems operate in subway (underground) or on elevated structures and do not cross major arterials at street level.

120 Calculated from 1996 National Transit Database. Light rail systems with downtown subways (Los Angeles and St. Louis) operate faster than 18.2 miles per hour, but still are slower than commuting by automobile.

121 Wendell Cox, Jean Love and Samuel A. Brunelli, *Reinventing Transit: Putting Customers First* (Washington: American Legislative Exchange Council, 1996).

122 Light rail speed calculated from 1996 National Transit Database. Express bus speed calculated from 1990 National Transit Database (which because of its design had more comprehensive speed data for express bus systems). Automobile commute speed from Nationwide Personal Transportation Survey, 1995.

123 Much of the new ridership on the new light rail lines has been parking lot to sporting events or other special events, school field trips to attractions such as zoos and parks and lunch hour ridership, which is encouraged by lower fares or free fares in the downtown area (such as Buffalo, Dallas, Portland, Sacramento, and St. Louis). None of these functions materially impacts peak period traffic congestion.

124 Jonathan E. D. Richmond, *New Rail Transit Investments - A Review* (Cambridge: Harvard University John F. Kennedy School of Government), 1998.

principal justification.[125]

BOX 2
WHY LIGHT RAIL DOES NOT REDUCE
TRAFFIC CONGESTION OR ITS GROWTH

1. **Light rail is too slow.** Average operating speeds are barely half that of the automobile during peak travel periods. In Dallas, light rail's speed is *less than one-half* that of the automobile. The automobile commuter switching to light rail could expect a doubling of travel time (or more if a transfer is required).

2. **Light rail serves too few origins and destinations.** In Dallas (a typical situation), the ultimate system will reach only one percent of the service area. This means that light rail will serve barely 0.1 percent (one out of every 1,000) of potential DART area origins and destinations.

[125] The author is sometimes labeled as "anti-rail" by rail proponents. In fact, when a member of the Los Angeles County Transportation Commission, Wendell Cox, authored the amendment that dedicated 35 percent of transit sales tax receipts to building rail (Minutes of the Los Angeles County Transportation Commission meeting, August 20, 1980), in the hope of reducing traffic congestion. This measure provided the local funding for three rail lines on which construction was begun in the 1980s. As new urban rail systems were opened in the 1980s and 1990s, it became clear that their traffic impact has been minimal. The author considers traffic congestion to be a serious problem that requires efficient use of the limited transportation funding that is available. Mis-allocation of resources to ineffective strategies, as urban rail systems has the effect of worsening traffic congestion. The author would be eager to endorse any rail program that cost effectively and materially reduced traffic congestion or its growth.

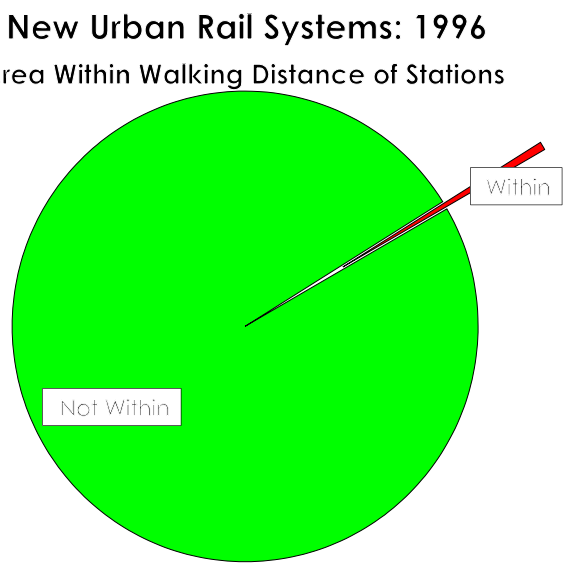

Figure 65
Source: Calculated from National Transit Database and Texas Transportation Institute data.

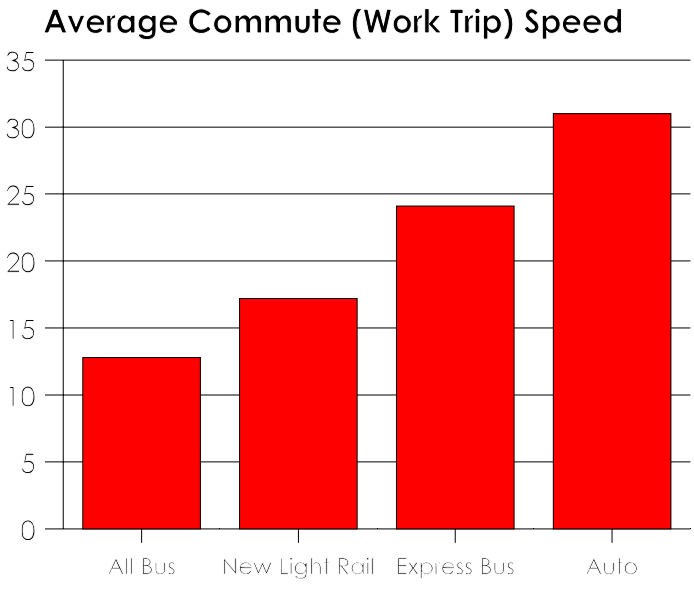

Figure 66
Calculated from U.S. Department of Transportation data.

Large Investment, Little Impact: By far the nation's most comprehensive,

extensive and expensive new rail system is the Washington Metro (heavy rail). This system has been key to a transit ridership increase in the Washington area of more than 100 percent over the last two decades. Yet, the rail system has done virtually nothing to reduce automobile use. The percentage of people driving into central Washington during peak hours has fallen only marginally (Figure 67), while the percentage of people driving across the suburban beltway has increased since the opening of Metro (Figure 68). Overall traffic level volumes have continued to grow, barely impacted by this $10 billion system. Metro's new ridership has largely been taken from buses and car pool passengers. Washington's transit work trip market share has fallen 13 percent since before Metro, and the overwhelming majority of new employment and *all* of the new population has been in the suburbs.

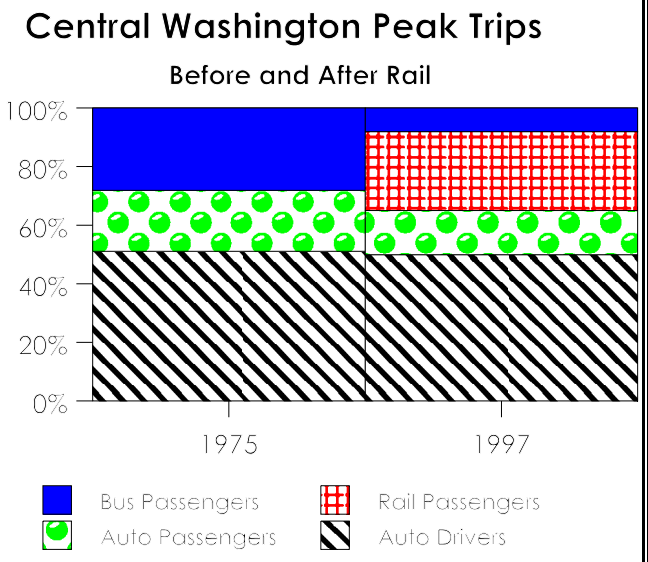

Figure 67
Calculated from Washington Council of Governments data.

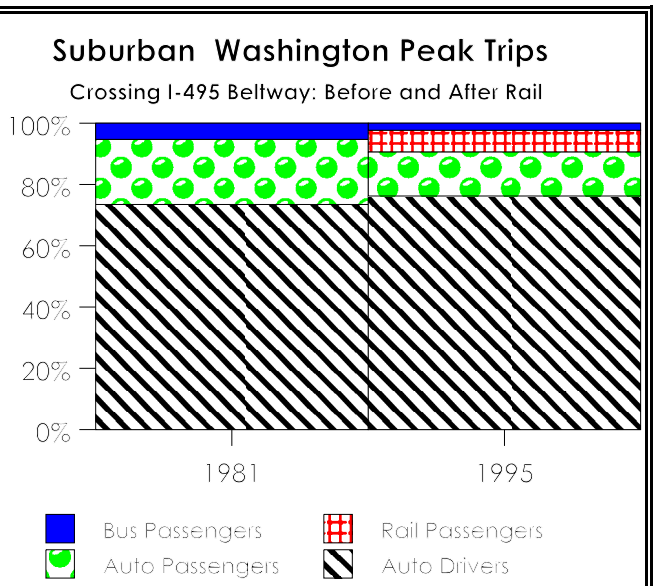

Figure 68
Calculated from Washington Council of Governments data

While *Mobility 2020* funding is skewed toward transit, and rail in particular, transit's market continues to become less significant. Downtown Dallas will have only 3.6 percent of Dallas-Fort Worth area employment in 2020 (Figure 69).

- More than 96 percent of employment growth in the DART service area will be outside of downtown.

- 99.5 percent of employment growth in the Dallas-Fort Worth area will be outside downtown.

Despite more than 200 percent projected population growth,[126] downtown will contain an infinitesimal percentage of the population (Figure 70). Virtually all population and employment growth will be outside downtown (Figure 71 and 72):

- 99.8 percent of population growth in the DART service area will be outside of downtown.

- 99.95 percent of population growth in the Dallas-Fort Worth area will be outside downtown.

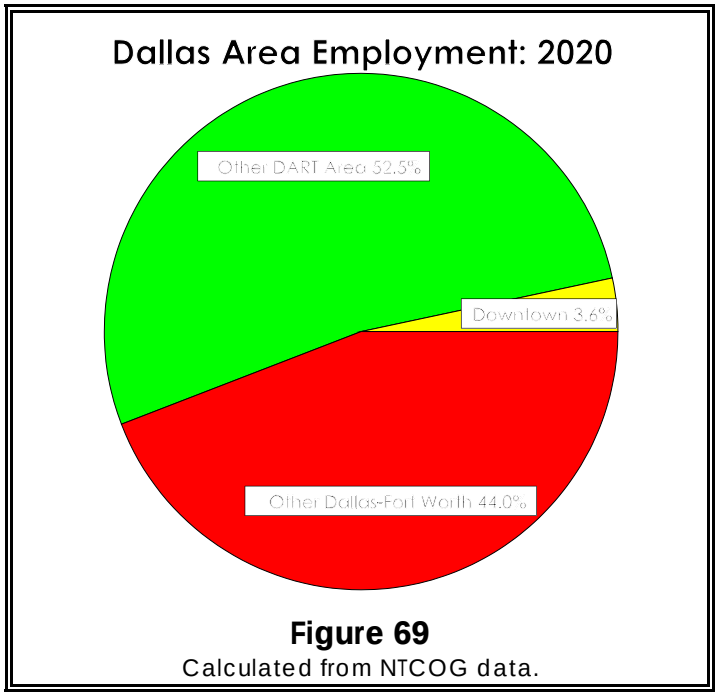

Figure 69
Calculated from NTCOG data.

[126] From 300 residents in 1995 to 1,000 residents in 2020.

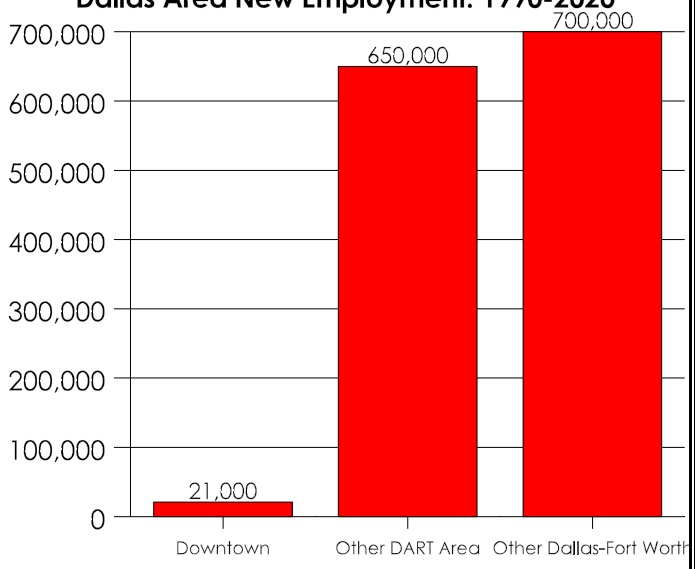

Figure 70
Calculated from NTCOG data.

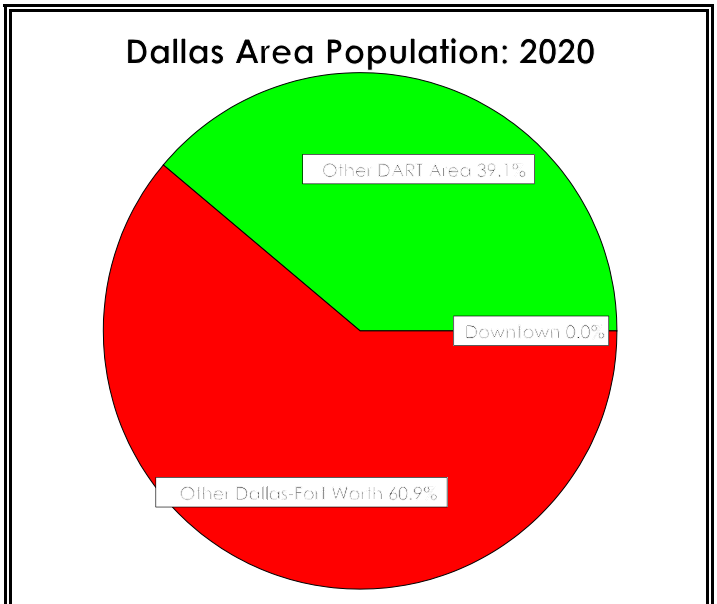

Figure 71
Calculated from NTCOG data.

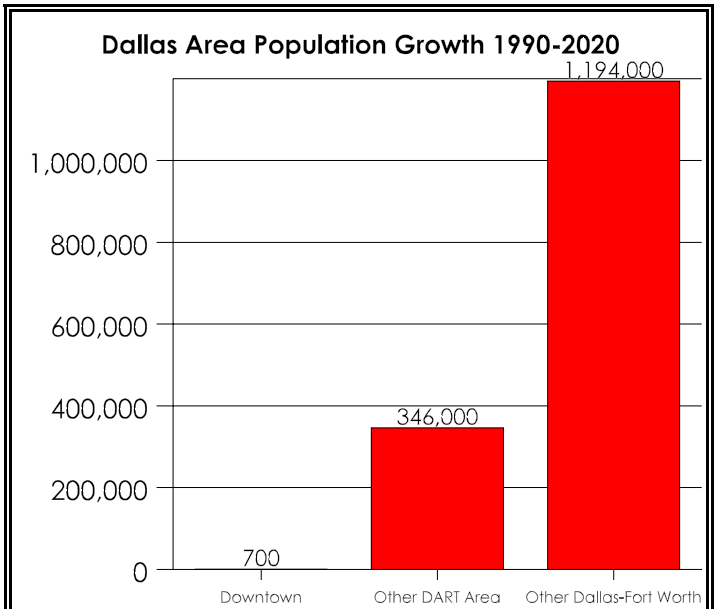

Figure 72
Calculated from NTCOG data.

Mobility 2020 is not an objective planning document. It would spend a highly disproportionate share of regional resources on fixed route transit (especially rail), which will continue to represent a small share of travel. At the same time, HOV lane development is comparatively limited, with most projects being single lane. Single lane HOV's are reversible, operating only in one direction during peak periods. Freeway travel demand, however, is no longer the predominantly one-directional demand that was characteristic of the 1950s and 1960s.

The apparent favoritism toward fixed route transit is illustrated by the following:

> *The public relies on transit more and more to make the necessary home to work trips, as well as for a large number of non-work related trips.*[127]

In fact, transit ridership has not increased in relative terms in the Dallas-Fort Worth area. And, work trip market share declined 31 percent between 1980 and 1990.[128] Doubtless transit carries a large number of non-work related trips, but it is an insignificant number in the context of the total trips in both the DART service

[127] *Mobility 2020*, p. XI-2.

[128] Latest data available. New transit market share data will be collected in the 2000 U.S. Census.

area and the Dallas-Fort Worth metropolitan area.[129]

Mobility 2020 is based upon wishful thinking. It is incomplete, unrealistic and unbalanced.

V. COMMENDATIONS

DART is due commendation with respect to the following:

- Aspects of DART's internal process are superior to that of most U.S. transit agencies. Unlike most U.S. transit agencies, DART reviews overall market share information and has adopted a cost containment policy (annual efficiency improvement of 1.5 percent).

- DART's highway based rapid transit program (HOV program) is improving travel times and reducing traffic congestion.

- DART competitively contracts 27 percent of its bus services, and all of its commuter rail and paratransit services. This results in lower costs.

- DART's extensive express bus system provides service in both directions and all day. Most U.S. express bus systems operate only during peak travel periods, and only in the peak direction.

VI. CONCERNS

The following are issues of concern with respect to DART and the regional planning process.

- Non-competitive bus and light rail operating costs are extraordinarily high.

- There appears to be little potential for increasing ridership substantially.

- DART's impact on traffic congestion is minimal.

- A disproportionate share of resources is being committed to rail services that will have little or no impact on traffic congestion.

- DART's transit services are considerably less safe than services in Austin,

[129] Public planning often relies on large numbers that are absent any context of the total number of trips in the area. Numbers large and small, however, are meaningless without context. For example, one might be concerned at having spent 300,000,000,000 (300 billion) nanoseconds at a particular activity, such as listening to a radio program. Yet, when it is understood that this is simply five minutes, it becomes clear that the large number is not significant.

Houston and San Antonio.

VII. OPPORTUNITIES TO BETTER SERVE THE RIDERS AND TAXPAYERS

There are significant opportunities for DART to better serve the riders and taxpayers, including:

- Unit Operating Cost Minimization
- Sales Tax Reductions
- Becoming a Regional Transportation System

Opportunity: Unit Operating Cost Minimization

DART unit costs are well above that of the market and other transit agencies. A package of three comprehensive strategies is proposed to reduce DART operating costs to the benchmark levels.

- Competitive contracting of bus service and light rail service.
- Reform of competitive contracting program.
- Unit cost regulation for cost elements not subject to competitive contracting.

Implementation of this program would make DART one of the nation's most efficient and effective transit agencies, and would also improve maintenance and administrative performance.

Public Private Competition: Increasingly, governments are adopting public-private competition (competitive contracting) to minimize transit costs (Box 3). Competitive contracting involves purchase of bus and paratransit services from the competitive market, with the transit agency retaining full control over service standards, vehicle appearance, routes, schedules, fares and transfer arrangements. Entire transit systems --- bus *and* rail --- are being converted to competitive contracting in Europe, Australia, New Zealand, South Africa and to a lesser degree, in the United States (Appendix C: Transit and the Market). DART itself competitively contracts 27 percent of its bus service and all commuter rail and paratransit service.

BOX 3
PUBLIC-PRIVATE COMPETITION

Public-private competition, or competitive contracting is referred to as "privatization" in some quarters. But competitive contracting is only one form of privatization, which also includes selling of publicly owned firms or assets to the private sector, discontinuance of a public policy role and vouchers. Unlike some forms of privatization, competitive contracting retains a strong publicly controlled service planning function, with the public agency responsible for the service retaining full policy control.

The term "public-private competition" is used because public employee groups are permitted to bid for service on the same terms and conditions as apply to private bidders. The result is the most cost efficient service.

The cost of DART's internally produced bus services is well above market levels. This is typical of an environment where the staffing, labor compensation and work rules are not subject to competition. Substantially improved cost performance can be achieved from a program that would convert transit services to competitive contracting at a rate that would not require layoffs.[130]

- Internally operated bus and light rail services would be converted to competitive contracting at the rate permitted by the natural attrition rate of operating personnel.[131] All increases in service would also be competitively contracted.

- All paratransit and commuter rail service would continue to be competitively contracted.

- Public-private competition would be used, a process in which DART employees would compete with private companies for service contracts. Safeguards would need to be established to ensure objectivity in the procurement process.[132] As in San Diego, London and other locations,

[130] DART competitively contracts a comparatively large portion of its bus service. However DART has not routinely subjected additional service to competitive contracting, and as a result the "ripple effect" on costs that has been identified in San Diego, London, Stockholm, Copenhagen and other locations does not operate in Dallas. Gradual conversion of non-competitive DART services would create the competitive environment necessary to reduce internal DART costs.

[131] Section 13(c) of the Federal Transit Act requires transit agencies to pay up to six years of severance to employees laid off due to efficiencies or economies. This extraordinary labor protection makes it expensive to convert quickly to competitive contracting, though studies have generally shown a payback period on labor protection payments of less than two years. By phasing the conversion to competitive contracting based upon the employee attrition rate, the costly Section 13 (c) provisions can be avoided, because there are no layoffs.

[132] A frequently recurring problem with public-private competition has been a public agency bias toward itself in terms of contract award.

substantial cost reductions can be expected within public agency operating departments once faced with competition.

- DART would hire no new operating personnel, except to staff competitively awarded service contracts.

As has occurred elsewhere, some of the services are likely to be awarded to the existing work force, as it becomes more efficient.

Reform of Competitive Contracting Program: DART should take steps to increase competition for its competitively contracted bus services. This is likely to result in lower costs. Like DART, Denver's Regional Transportation District encountered difficulty in attracting competition. In the 1993 rebid of its statutorily required 20 percent competitive contracting of bus service, only incumbent operators submitted proposals.[133] Denver's just completed re-procurement of the same service attracted five bidders in addition to the incumbent, and resulted in a contract award at 15 percent below previous rates.[134] This was accomplished by:

- Breaking the service into discrete packages that could be separately bid by smaller companies or companies not interested in providing all of the service.[135]

- Taking considerable effort to solicit operators to bid and convince them that no operator has an advantage over another. This was a particularly important initiative, because private companies are not likely to submit proposals if they believe that the incumbent has an advantage (political or otherwise). Preparation of a proposal on a procurement the size of the DART contract can cost more than $50,000.

CPI-X Regulation: As the gradual conversion of services to competitive contracting proceeds, unit cost regulation should be used to reduce the costs of functions that are not subject to competitive contracting. The recommended regulatory mechanism would be "CPI minus X" (Consumer Price Index minus X). CPI-X is being increasingly used in Europe and in some states for regulation of public utilities, such as electric utilities, natural gas utilities, and

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[133] In the course of a management review, the author was told by some companies that did not submit proposals that they believed that the incumbent operators had an advantage and it would therefore be fruitless for them to bid.

[134] *The Urban Transport Fact Book*, Internet: www.publicpurpose.com/ut-denct99.htm.

[135] There may be an administrative preference for competitively contracting a service such as the UT Shuttle to a single contractor. Such an approach tends to be anti-competitive and overly expensive, because larger contracts tend to discourage smaller operators, while the reduce competition tends to raise prices. London Transport has divided its service area into more than 200 service packages, yet maintains a fully coordinated transit system.

telecommunications utilities. CPI-X would require annual operating cost per vehicle hour reductions by a specific percentage (such as 2 percent, or CPI-2). CPI-X regulation would work as follows:

- As soon as practicable, the Board of Directors would establish a CPI-X standard for both bus and light rail services. The annual CPI-X standard would be established at a rate that would achieve the benchmark cost per vehicle hour over a ten year period. (At the present efficiency improvement target rate of 1.5 percent, achieving the bus benchmark would require more than 40 years.)

- Based upon 1996 information, a standard of CPI-7.3 (7.3 percent annual reduction in bus operating costs per vehicle hour, inflation adjusted) would be appropriate for bus service.

- Based upon 1996 information, a standard of CPI-4.7 (4.7 percent annual reduction in bus operating costs per vehicle hour, inflation adjusted) would be appropriate for light rail service.

- The Board of Directors would budget all functions not performed through competitive contracting based upon the adopted CPI-X standard.

Projections: The cost minimization policies would substantially reduce transit operating expenses. The cost minimization program would reduce DART bus and light rail costs to approximately $133 million in 2009, down from $191 million in 1999. Without cost minimization, bus and light rail operating costs would rise to $250 million by 2009. The savings from the cost minimization program are projected at $707 million[136] over the next ten years and $118 million in 2009 alone (Figure 73 and Table E-24).[137]

[136] To illustrate the value of this sum, if applied to freeway lane construction, 125 one-way lane miles could be built (based upon inflation adjusted costs per lane mile in *Mobility 2020*). This amount of additional roadway would reduce the Dallas Roadway Congestion Index five percent. This would not interfere with the presently planned transit service improvements, which would be implemented, but at lower, more appropriate costs.

[137] The actual savings could be more or less, depending upon market conditions.

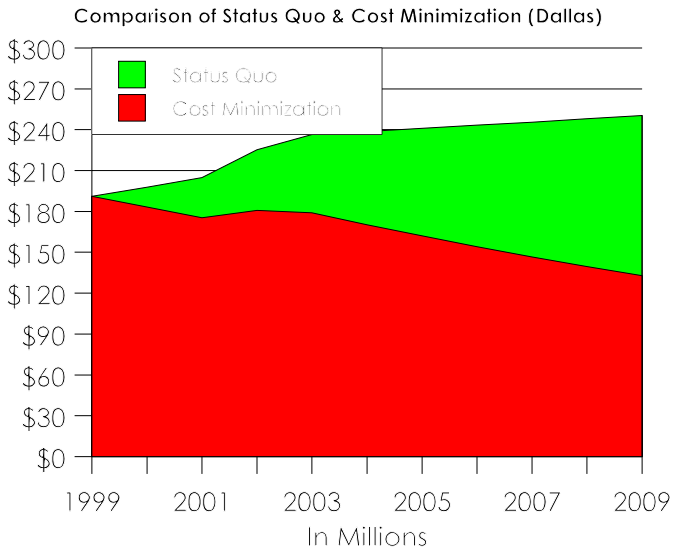

Figure 73
Projected using DART data.

Opportunity: Sales Tax Reduction

The savings from the cost minimization program could be used to reduce the DART sales tax, while preserving currently planned service levels. This would create additional jobs in the Dallas area.[138] Currently, state law permits DART to raise or lower its sales tax in increments of 0.25 cents, within the one-cent limit approved by the voters. In 1999, approximately $80 million will be collected per one-quarter cent of sales tax. DART currently taxes at the one-cent rate, which is also the state legal maximum. By 2002, the savings from the cost minimization program would permit a 0.1 cent reduction in the tax, and another similar reduction would be possible in 2010. Through 2009, such a sales tax reduction would save DART service area taxpayers more than $410 million. These tax reductions would require a change in state law to permit smaller tax reductions than 0.25 cents.

Opportunity: Becoming a Regional Transportation System

There is a need to adopt a long term plan that is both balanced and realistic. The present predilection toward rail is costly and will make virtually no difference with respect to traffic congestion (and as a result, will not reduce air pollution).

[138] It has been estimated that each reduction of $1.00 in sales tax collections facilitates $0.26 in economic growth. (Dale W. Jorgerson and Kun-Young Kim, "The Excess Burden of Taxation in the United States," *Journal of Accounting, Auditing and Finance*, September 1990).

Alternatively, despite the comparatively low costs, DART is already achieving substantial success in reducing traffic congestion through its HOV program. DART and regional projections indicate that this progress will continue.

Further, DART's HOV program is more regional in nature, unlike the fixed route (bus and rail) transit system, which serves primarily downtown oriented corridors, and at speeds insufficient to attract significant numbers of commuters from their automobiles. The regional effectiveness of the HOV program is illustrated by DART's 2010 projection of HOV usage. Only five percent of HOV passengers will be on DART buses. The other 95 percent will be in car pools or other forms of ridesharing. The HOV system provides alternative transportation throughout a large portion of the DART service area.

The HOV program, however, could be much more substantial. The one-way reversible HOV lanes should be built instead as two-way HOV lanes that can be used all day. This would provide an alternative to single occupant commuting for a much larger percentage of the traveling public. In addition, HOV lanes could be provided on other freeways.

As DART data indicates, the HOV system is by far the most cost effective portion of the DART system. DART could far better serve the entire community by placing resources that would otherwise build rail systems and savings from the cost minimization program into HOV development.

DART should undertake a comprehensive review of its future transportation spending and implement those programs that are most cost effective in reducing traffic congestion and air pollution. In considering future transportation projects, DART and regional officials should rely on three criteria suggested by U.S. House of Representatives Majority Whip Tom DeLay.[139] These criteria were suggested with respect to urban rail, but are appropriate for any major transportation improvement (Table 3).

Whether we build rail should depend upon three criteria.

- ***The first has to do with reducing traffic congestion. Rail's success is not demonstrated by the number of people on the train, rather it is demonstrated by how many cars it takes off the road. The number must be material.***

- ***The second test is financial -- that whatever rail accomplishes, it should do so for less than any other alternative.***

- ***And the third criteria is just as important -- that the alternative finally***

[139] A Member of the Transportation Appropriations Subcommittee.

selected must be the result of objective and rigorous planning and studies, whose design and processes are not skewed for or against any alternatives.[140]

TABLE 3 DELAY MAJOR TRANSPORTATION IMPROVEMENT PRINCIPLES EVALUATION CRITERIA	
No.	**Criteria**
1	EFFECTIVENESS: The proposed project must materially reduce traffic congestion during peak hours.
2	COST EFFICIENCY: The proposed project must be the most cost effective strategy for achieving the traffic congestion reduction.
3	OBJECTIVITY: The planning process must have included an objective analysis of all reasonable alternatives.

Perhaps the principal driving force in public transit infrastructure improvements is the availability of federal discretionary funding. Local areas have the potential to obtain up to 80 percent federal funding match rates. But there is not enough federal or local funding available to provide the extent of conventional bus or rail public transit service that would make a material difference in Dallas' traffic congestion and air pollution.

DART should seek to become a regional transportation system, not just a downtown transportation system.[141] The scarce resources available should be spent on strategies that improve *regional* transportation --- strategies that make it possible for non-single occupant travelers to quickly and conveniently travel from any location in the metropolitan area to any other location. Additional rail should be built only if it can be shown to be more cost effective than bus/HOV lanes per unit of reduced traffic congestion and time savings.

The national experience and the experience at DART suggests that other strategies would be more effective. In modern sprawling urban areas like Dallas (or Houston, Chicago, New York, Seattle, etc.), the evidence indicates that bus and car pool-based rapid transit systems are by far the most effective and efficient strategy for using the federal money that is earmarked to public transit.

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140 "Look at the data before climbing aboard light rail," by Representative Tom DeLay (U.S. House of Representatives Majority Whip), op-ed in the *Houston Chronicle*, June 21, 1998. Highlighting not in original.

141 It is not recommended that conventional transit services to downtown be reoriented to other areas, since downtown service represents by far the most efficient use of fixed route services. Conventional transit services are largely incapable of providing an alternative to the automobile in any other market.

VIII. SUMMARY OF OPPORTUNITIES

Public officials have an opportunity to improve transit's performance in the Dallas area. The identified opportunities are outlined in Table 4.

TABLE 4
SUMMARY OF OPPORTUNITIES

	Opportunity	Public Purpose Served
1.	Unit Operating Cost Minimization • Competitive conversion without employee layoffs. • Unit Cost Regulation (CPI-X).	Lower unit costs would make higher service levels and lower fares possible for riders and better value in return for the funding supplied by taxpayers. Savings: $707 million over the next decade.
2.	Sales Tax Reductions • 0.2 cent in 2003. • another 0.1 cent in 2010.	Lower taxes for taxpayers, greater job creation. Tax reductions: $410 million over the next decade.
3.	Becoming a Regional Transportation System • Expand busway/HOV program. • Build no additional rail lines .	Mobility for the entire region, not just to downtown

APPENDIX A: TRANSIT'S OBLIGATION TO EMPLOYEES

A public transit agency's obligation to riders and taxpayers is to use the revenue it collects from them to provide cost efficient and effective transit service. This obligation does not permit paying more than necessary for any factor of production, including labor. A public transit agency's obligation to employees with respect to compensation is simply to pay market rates.

To the extent that a transit agency compensates employees at greater than market rates, it spends more than necessary to provide the transit system. It is estimated that average transit agency bus driver compensation exceeds market rates by nearly 50 percent, though many public transit agencies pay considerably more. Above market labor compensation does not represent a subsidy to transit, it is a subsidy to labor. Labor subsidies serve the private purposes of employees, to the detriment of the public purpose of a transit agency to serve the riders and taxpayers.

- Riders gain no benefit from higher than necessary spending on employee compensation. On the contrary, the interests of riders are violated to the extent that lower fares and higher service levels are not provided with the unnecessarily higher levels of spending.

- Taxpayers do not benefit from higher than necessary spending on employee compensation. Paying higher employee compensation than necessary increases the demand for higher taxes.

In violation of public purposes (and in service to private purposes), U.S. transit agencies have generally served the private interests of employees in preference to the public interest of the riders and taxpayers. Transit remains virtually the last transportation industry that has not been reorganized to primarily serve the interests of customers, while serving the interests of employees in terms of market (competitive) obligations. The airline, private bus and trucking industries have all been deregulated over the past 20 years. This process has not been easy for employees, but has resulted in far more than compensating benefit for consumers.

The fundamental purpose of a business is to earn its owners a sufficient return on investment. This is accomplished by serving customers with competitively priced goods and services. No business could survive for long compensating its employees at above market rates. A bank or store that paid its employees 50 percent more than market would soon fail. Similarly, the fundamental purpose of a transit agency is to serve customers, the riders and taxpayers, providing effective and cost efficient transit service.

APPENDIX B: THE COMPACT CITY

The Problem: "Urban Sprawl"

An increasing amount of attention is being directed toward the development of American urban areas, especially the phenomenon of "urban sprawl." For decades the land area growth of American urban areas has been much greater than the population growth. This geographic expansion is often attributed to increasing dependence upon the automobile and the construction of the interstate highway (freeway) system. A relatively new school of urban planners, "the new urbanists" blame a number of problems on the expanding urban area, including increased traffic congestion, higher air pollution, the decline of central cities and a reduction in valuable agricultural land (new urbanist policies also go by the label "smart growth"). Moreover, new urbanists believe that more spacious urban areas typical of the United States are inherently inefficient relative to more compact cities, exhibiting higher costs for infrastructure and public services.

The "New Urbanism"

New urbanist literature often cites Europe's more compact and more densely populated urban areas as superior to those in the United States. The new urbanist vision includes:

- Establishment of urban growth boundaries (UGB).
- Channeling urban development toward "infill" (undeveloped areas within the urban growth boundary).
- "Transit oriented development" along urban rail corridors, higher population density and higher employment density.
- Little, if any, expansion of street or highway capacity.
- Retail developments less oriented to the automobile (smaller stores with less parking generally located in town centers rather than suburbs).

The new urbanists believe that these strategies will produce a more compact city in which automobile dependency, traffic congestion and air pollution are reduced. New urbanism concepts have been incorporated into a number of state laws and regional planning policies. Portland (Oregon) represents the most advanced U.S. model of new urbanism policies, where a long range plan

has been adopted by an elected regional government.[142] The plan involves an urban growth boundary,[143] more dense employment and housing patterns, significant expansion of the light rail system and little street or highway expansion. New urbanist policies, and especially their adoption in Portland has evoked considerable interest among legislators, local officials and civic leaders around the world. There are, however, difficulties with new urbanism, both in terms of analysis and policies.

Analytical Difficulties

Major tenets of the new urbanism rest on false premises.

Traffic congestion is *greater,* not less in the compact city: Higher concentrations of urban residential and employment density will produce higher concentrations of automobile traffic (and air pollution). This is already evident. Contrary to new urbanist claims, traffic congestion is already worse in urban areas with higher densities.

- Urban areas with higher levels of traffic congestion, as measured by the federal government's "Roadway Congestion Index" have higher population densities (Figure 74).[144] This is to be expected, since higher density means less road space on which to accommodate the high volume of private vehicle traffic.

- Transit oriented development *increases* traffic congestion. Except in a very few centers, such as Midtown Manhattan and Chicago's Loop,[145] a majority of trips are by automobile. The overwhelming majority of travel to proposed transit oriented developments will be by automobile (new employment centers attract from six to 100 times as many automobile commuters as transit commuters). The higher concentrations of employment and residences must therefore bring an increase in automobile trips in the area. This will strain road space, slowing traffic and increasing pollution as a consequence (below).

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142 The regional government has ultimate control over land use and zoning issues and requires local municipal plans and ordinances to conform to the regional plan.

143 The urban growth boundary requirement was imposed by state law in the 1970s. At that point the urban growth boundary was established well outside the limits of development. In recent years, development has approached the urban growth boundary.

144 Calculated from 1996 Roadway Congestion Index as developed by the Texas Transportation Institute of Texas A & M University for the United States Department of Transportation.

145 Private vehicles (automobiles and trucks) carry more than twice as many work trips as transit to all but nine central business districts in the United States.

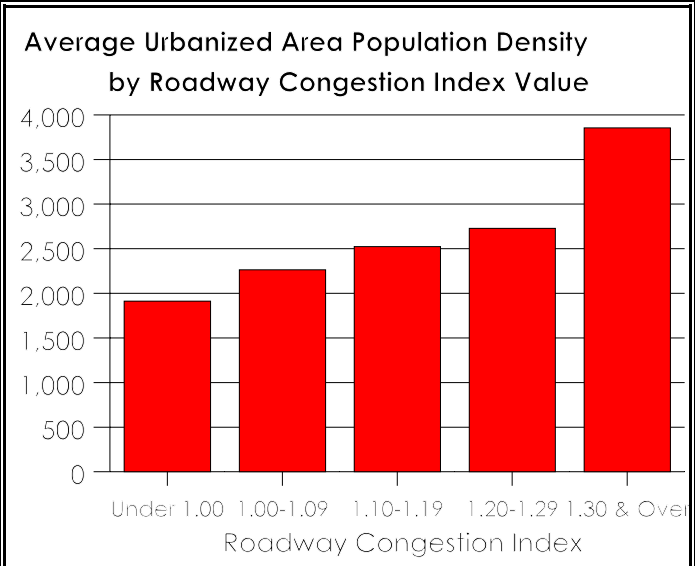

Figure 74
Calculated from Texas Transportation Institute data.

Air pollution is *greater,* not less in the compact city: Higher levels of air pollution are associated with *higher* densities, not lower densities. Generally, the greater the intensity of air pollution, the higher the population density (Figure 75).[146] As transit oriented development increases traffic (above), it will reduce speeds and increase pollution, because higher pollution is associated with slower, more congested traffic. To the extent that new urbanist policies are implemented, air pollution is likely to be *increased* relative to levels that would be experienced in less dense environments.[147]

[146] Randall O'Toole, "Dense Thinking," *Reason*, January 1999, based upon U.S. Environmental Protection Agency data.

[147] Because of the continuing improvement in air pollution that is attributable to improved vehicle emission technology, aggregate levels of air pollution could be reduced from present levels even with the higher concentrations of automobile traffic that would be the result of new urbanist policies.

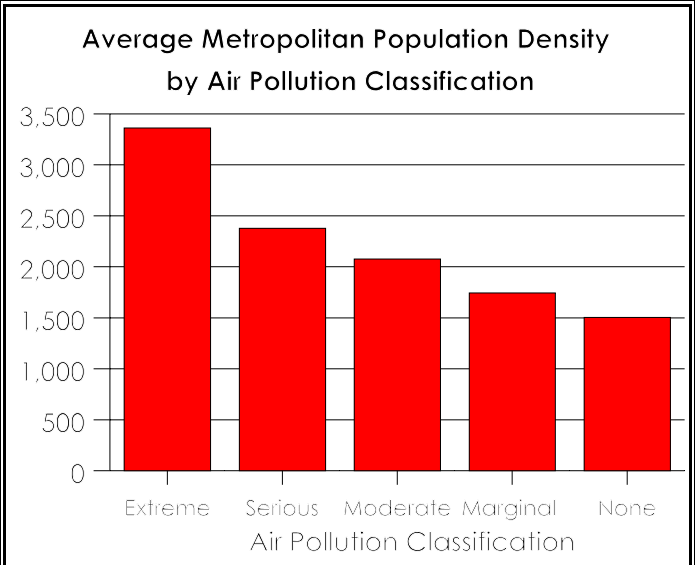

Figure 75
From O'Toole based upon U.S. Environmental Protection Agency data.

Cities are not crowding out agricultural production: Expanding urban areas do not threaten agricultural production. Since 1950, U.S. agricultural acreage has fallen by 15 percent, while production has risen by more than 105 percent (Figure 76). The area required for agricultural production has declined, quite independently of urban expansion. Between 1960 and 1990 the area taken out of agricultural production was greater than that of Texas, and more than eight times the area consumed by expanding urban areas (Figure 77). At current rates of urban expansion it would take more than 250 years to urbanize the amount of agricultural land taken out of production between 1960 and 1990.

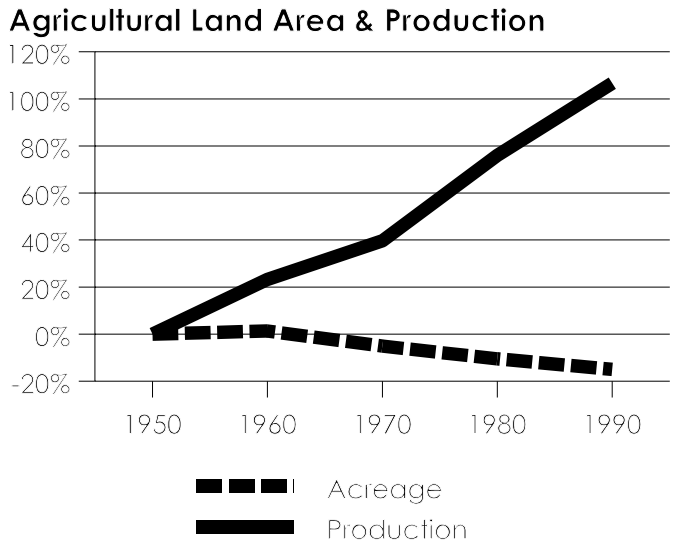

Figure 76
Calculated from U.S. Department of Agriculture data.

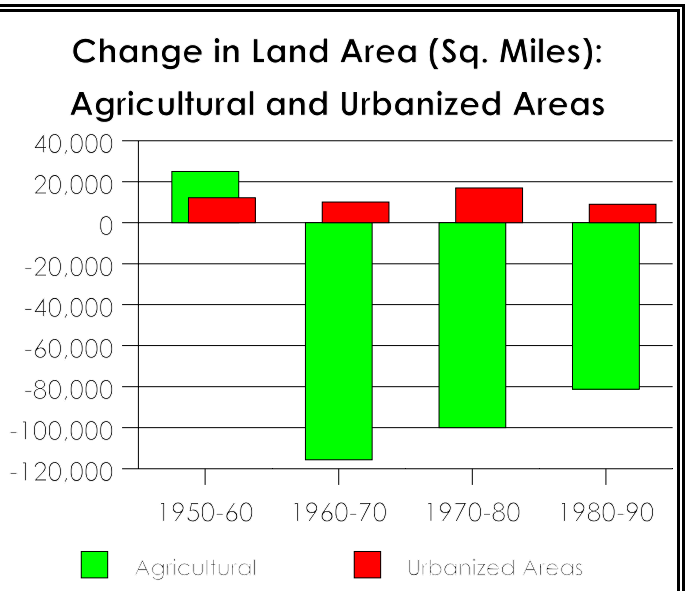

Figure 77
Calculated from U.S. Census Bureau data.

There is more to urban land expansion than interstate highways: Urban expansion is far too complex to be blamed simply on the automobile and interstate highways. First of all, urban interstates were largely not open until the early 1960s (the Interstate Highway Act was enacted in 1956). Yet the suburbs were already gaining population at the expense of the central cities. During the 1950s, the major central cities that did not expand by annexation lost approximately 5.0 percent of their population. Similar rates of *pre-interstate*

urban population loss occurred in the 1960s (7.2 percent) and the 1980s (5.7 percent).[148] Only during the 1970s was the rate significantly higher, at 14.6 percent. Other factors that were probably much more responsible for flight from the central cities, include those such as escalating crime rates, the urban riots of the 1960s, and declining educational performance in central city school districts. Indeed, the 1970s, during which urban flight was the greatest, followed closely on the urban unrest of the 1960s and was also a period of particular deterioration with respect to the crime rate and educational performance. Other factors contributed, such as higher central city taxes, lower quality central city services and increasing affluence, allowed people the option of living in larger houses on larger lots.

Lower public service costs are associated with lower, *not higher,* densities: It is claimed that more sparse development patterns result in higher public services costs. For example, more miles of sewers and roads are needed. Higher costs might be associated with lower densities if infrastructure costs were the dominant factor in public service budgets. But there are a number of reasons why the reality differs from the theory on urban costs. Operating costs, not infrastructure costs, represent more than 60 percent of most local government budgets, and those costs tend to be much higher in the more dense central cities.[149] The larger, more dense local government units tend to have larger bureaucracies and their political processes are more susceptible to special interest control. Both of these factors tend to increase costs.[150]

"Smart Growth" Could be No Growth: Increasing density and growth restrictions are likely to negatively impact economic growth in metropolitan areas adopting new urbanist policies. For example, even Portland's new urbanist regional government (Metro) found that higher densities and lower automobile usage rates appear to be associated with "higher housing prices and reduced housing output."[151] As a result of higher housing prices, new urbanist policies are likely to make the "American dream" of home ownership more elusive. They are, by limiting housing output, likely to limit job creation in construction trades and allied fields. Further, discouraging construction of additional suburban shopping centers can be expected to raise the cost of living, because there will be less competition in retailing. This will retard job growth even more. Further, discouraging construction of additional suburban shopping centers can be

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[148] With lower population growth projected in the future for the United States, it is expected that the rate of urban land expansion will continue to decline.

[149] For example, see Helen F. Ladd, "Population Growth, Density and the Costs of Providing Public" *Services*, *Urban Studies*, Vol 2, 1992, pp 273-295, and Wendell Cox, *Local and Regional Governance in the Greater Toronto Area: A Review of the Alternatives* (City of Toronto, 1997).

[150] *Local and Regional Governance in the Greater Toronto Area: A Review of the Alternatives.*

[151] *Metro Measured* (Portland: Metro, 1994), p. 45.

expected to raise the cost of living, while retarding job growth even more. Broad implementation of new urbanist policies could well bring to the United States the economic stagnation that afflicts Europe, where minimal job creation and high unemployment are associated with a high cost and less competitive economy.

Portland's policies will produce *more* traffic congestion and air pollution, not less: Portland's new urbanist policies will not deliver lower levels of traffic congestion and air pollution. Portland's regional government, Metro, has stated that:

> *... with respect to density and road per capita mileage it (Los Angeles) displays an investment pattern we desire to replicate.*[152]

Portland is well on the way to replicating the traffic congestion problems of Los Angeles. Traffic congestion is already approaching that of the New York metropolitan area, which is 15 times larger. Portland projections indicate that, even after building five additional light rail lines,[153] traffic volumes will rise by more than 50 percent by 2015. It is estimated that Portland's Roadway Congestion Index will rise to 1.62, from its current 1.16 (Figure 78). This would represent a worse level of traffic congestion than is currently experienced by Los Angeles (which has the highest Roadway Congestion Index in the nation). Portland seems to have chosen a future with two million cars in 500 square miles instead of 600. It can be expected that air pollution will be greater as a result.

[152] *Metro Measured*, p. 8.

[153] It is less than certain that these lines will be built. In November of 1998, voters in Portland turned down a bond issue to build the next line.

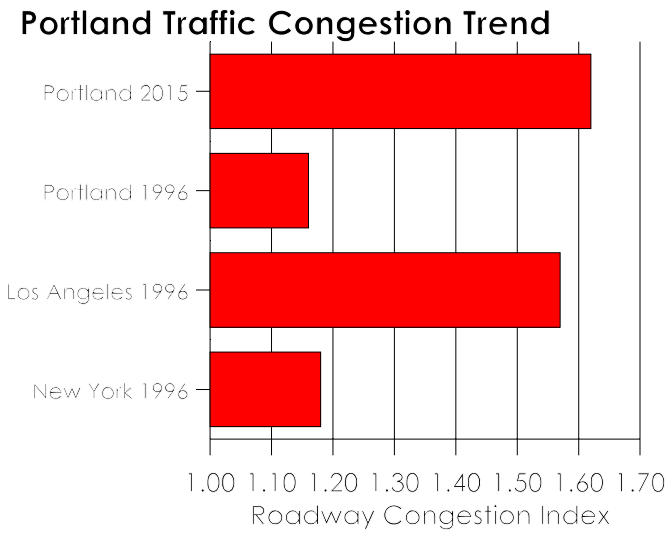

Figure 78
Estimated from Texas Transportation Institute and Portland Tri-Met data.

Europe is suburbanizing too: European cities are suburbanizing, despite their higher population densities, more comprehensive transit systems, higher gasoline prices, lower income[154] and more focused cities.[155] Like their American counterparts, many European central cities have lost population.

- No freeways enter the central city of Paris, which has one of the most intensive rail transit systems in the world. Yet the Paris' central city population loss and its suburban population explosion mirrors that of Philadelphia, a metropolitan area that has experienced similar overall growth (Figure 79). At the same time, both traffic congestion and air pollution are severe. Average automobile travel speed in the city of Paris is 12.5 miles per hour.[156]

- Inner London and Manhattan (inner New York) lost virtually the same percentages of population over the last 40 years to 1990-1 (25 percent and 24 percent, respectively).

- The cities of Copenhagen, Liverpool, Manchester and Glasgow lost approximately 40 percent of their population in the last 40 years. By comparison, Detroit and Cleveland lost 45 percent, Newark lost 39 percent and Washington lost 32 percent. In each of these European and

[154] OECD purchasing power parity basis.

[155] Christian Gerondeau, *Transport in Europe* (Boston, MA: Artech House, Inc.), 1997.

[156] Gerondeau.

American cities, *all* growth was suburban growth.

- The central city of Stockholm has lost 16 percent of its population since 1950, with all growth occurring in the suburbs.

The same pattern is occurring in other developed nations as well.

- While San Francisco's population was rising one percent from 1970 to 1990, Toronto fell eight percent and Montreal fell 20 percent.

- Tokyo's population has fallen more than two million since 1960, with all population growth occurring in the suburbs.

Central area populations have fallen in virtually all cities in the developed world.[157] In most cases, the declines are masked by population added through annexation or consolidation. In fact, central area depopulation and suburban expansion has been occurring for some time. Inner London began losing population between 1901 and 1911, while Manhattan began losing population between 1910 and 1920. Central area depopulation was first noted in Philadelphia between 1820 and 1830, as people moved to the suburbs.[158]

The depopulation of central cities in Europe and other developed nations is particularly notable, because they were generally not faced with important factors that contributed to the depopulation of U.S. central cities, such as high crime rates, urban riots, forced busing, falling education standards, freeways and home mortgage tax deductions. In addition, Europe's much stronger land use policies, higher suburban land costs and overall higher cost structure might have been expected to forestall suburbanization.

Europe's comparatively high public transit market share has led to the mistaken impression that transit is gaining at the expense of the automobile. This is not the case. European automobile use has grown at three times the U.S. rate since 1970, largely as a result of increasing affluence. In recent decades, transit market shares have dropped from even higher levels in Europe as increased affluence has made the automobile affordable for more people. In Europe (as in the United States) urban rail's record of attracting people out of automobiles has been insignificant: *no such transfer has ever taken place*.[159] Europe's trend toward higher automobile dependency and lower transit market shares is

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[157] In North America, only one city that has not annexed new territory and was fully developed by 1950 has increased in population: Vancouver.

[158] Kenneth T. Jackson, *Crabgrass Frontier: The Suburbanization of the United States* (New York: Oxford University Press, 1985), p. 318.

[159] Gerondeau, p. 87.

following U.S. trends by a decade or two, just as its rising affluence has followed U.S. trends.

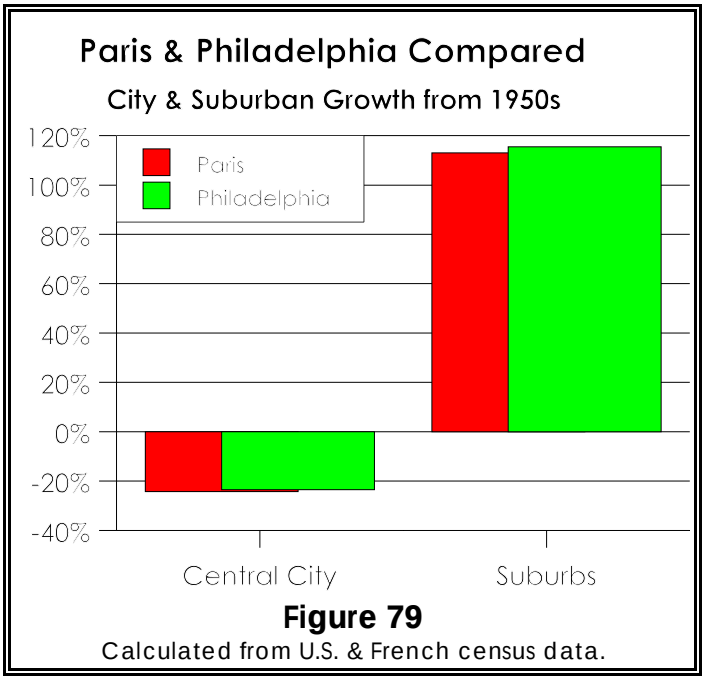

Figure 79
Calculated from U.S. & French census data.

Urban Growth Boundaries Will Not Reduce Traffic Congestion or Contain Growth: Urban growth boundaries (UGB) are development limits established by local governments. Development is generally not permitted outside urban growth boundaries. By imposing urban growth boundaries, new urbanists hope to force higher densities and infill development. No material increase in density is likely to occur, except where the urban growth boundaries encompass wide expanses of undeveloped land (as was the case in Portland when its urban growth boundary was established). Even Portland's draconian policies are projected to increase densities to a level *less than Los Angeles*. Portland will continue to have densities that are barely one-quarter of Paris, which is highly automobile dependent except in the inner city. While new urbanist policies may produce small reductions in average automobile miles traveled per capita, the increasing traffic congestion is likely to generate a more than compensating increase in the average automobile hours per capita traveled by automobile. This will increase air pollution and retard the quality of life by reducing leisure time.

Urban growth boundaries have a long history of failure with respect to containing growth.

- Queen Elizabeth I established an urban growth boundary in London in the

16th century.[160] Development outside the UGB continued.

- King Louis XIII established an urban growth boundary in Paris in 1638. It failed to contain development, just as did subsequent UGB's established by King Louis XIV and King Louis XV.[161]

- London imposed an urban growth boundary by purchasing a "Green Belt" surrounding the city in the 1930s. Since that time London's population density inside the Green Belt has fallen, as 1.5 million people have left the city. Inner London's population dropped 43 percent, while that of outer London (the pre-1940 suburbs inside the Green Belt) rose 12 percent. Population in the surrounding counties increased 273 percent,[162] as development "leap-frogged" across the urban growth boundary to exurban areas beyond the Green Belt (Figure 80). The 1931 census indicated that 19 percent of the population was outside what was to become the Green Belt. The 1991 census showed that more than one-half of the population was in the outer counties.

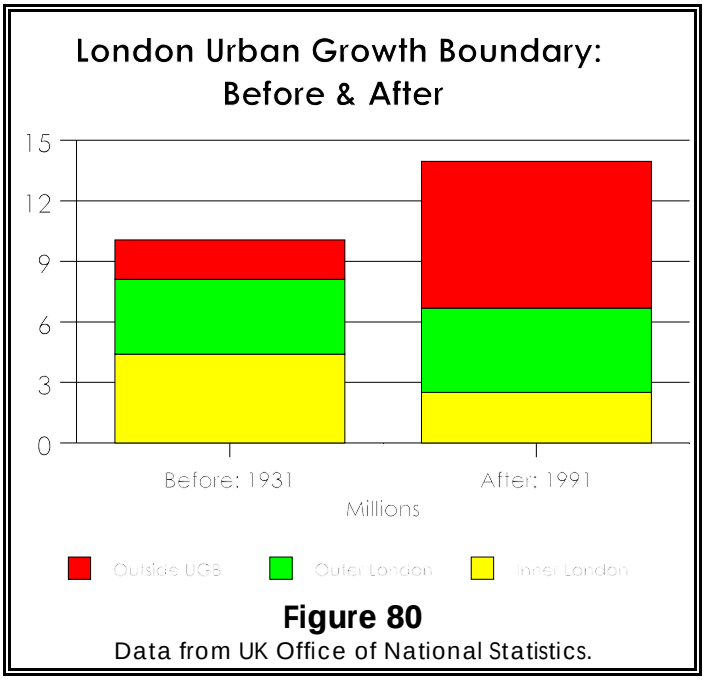

Figure 80
Data from UK Office of National Statistics.

There are Two Sides to Urban Expansion (Urban Sprawl)

Despite all of the criticism, America's spacious urban areas provide significant

[160] Stephen Inwood, *A History of London* (London: MacMillan, 1998), p. 192.

[161] Johannes Willms, *Paris: Capital of Europe* (New York: Holmes & Meyers, 1997), p. 3.

[162] This compares to national population growth of 22 percent over the period.

advantages. Their very geographical expansion has provided a "safety valve" that has kept travel times relatively stable.[163]

- Average peak hour commuting time fell approximately six percent from 1969 to 1995 (from 22.0 minutes to 20.7 minutes).[164]

- The automobile has improved travel times. According to the United States Department of Transportation, one of the most important reasons that average commuting time has not increased materially over the past 25 years is that people have abandoned transit services for automobiles, which are considerably faster.[165] The average transit commute trip takes approximately 80 percent longer than the average automobile commuter (Figure 81).[166]

- The flexibility of the automobile has improved the efficiency of labor markets, making a much larger market of employers and employees conveniently accessibly to one another.

- The competition provided by large suburban shopping malls and retailers has lowered consumer prices.

The spacious urban area, with its increased retail competition and more efficient labor markets have helped to create a comparatively low cost economy in the United States. It is likely that these advantages of the spacious urban area have contributed to America's unparalleled standard of living.[167]

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[163] Peter Gordon and Harry W. Richardson, "The Costs and Benefits of Sprawl," *The Brookings Review,* Fall 1998.

[164] Calculated from *Nationwide Personal Transportation Survey*.

[165] *Our Nation's Travel: 1995 NPTS Results Early Report*, U.S. Department of Transportation Federal Highway Administration, September 1997.

[166] Calculated from *Nationwide Personal Transportation Survey,* 1995.

[167] According to the latest Organization for Economic Cooperation and Development, data the United States had the highest gross domestic product per capita of any major nation (on a purchasing parity power basis, which measures cost of living). One small nation, Luxembourg was higher. Luxembourg, with 418,000 people (1996) would rank 94th if it were a U.S. metropolitan area, just ahead of Modesto, California.

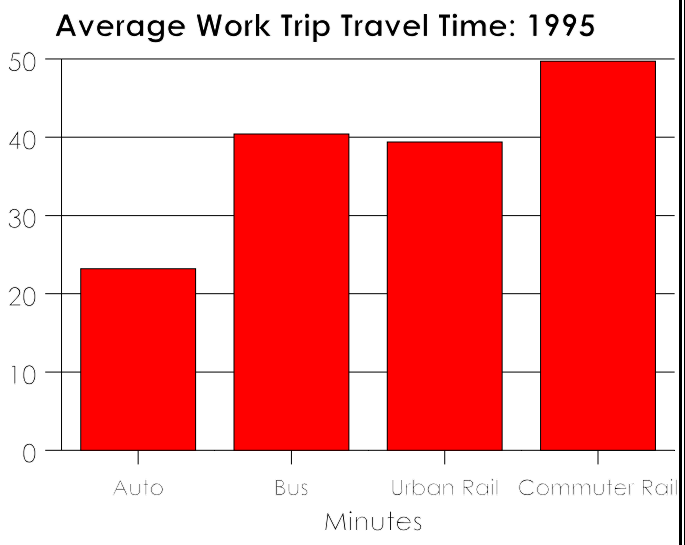

Figure 81
Calculated from *Nationwide Personal Transportation Survey* 1995 data.

This is not to suggest that traffic congestion is not a problem. But today's urban motorist experiences much greater mobility and speed than can be provided by any practical alternatives. The question is not how governments are going to force people out of their cars, it is rather whether capacity will be provided for the traffic growth that will occur regardless of which measures are finally adopted. Unless the automobile is accommodated, traffic can and will get much worse. Few places in the United States experience the intractable traffic congestion that is a day-to-day occurrence in the largest centers of Europe, despite higher densities, rail transit and strong land use controls.

New Urbanist Policies Cannot Achieve New Urbanist Objectives

The fundamental problem with the new urbanism is that, despite aggressive planning policies, it is incapable of either sufficiently increasing densities or materially improving the match between origins and destinations sufficiently to make alternatives to the automobile viable. Much stronger land use policies and much higher densities in suburban Stockholm failed to produce the anticipated reliance on rail transit, as automobile use continued to increase substantially.[168] It is "neither certain nor self evident" that new urbanist policies, if

[168] Sir Peter Hall's *Cities in Civilization* describes the resistance of Stockholm area residents to planning dictates that required suburban development to be on rail lines and at higher housing densities. In recent years, most new housing has been single family detached and automobile dependency has increased (New York: Pantheon, 1998), p. 842-887.

they were to occur, would reduce traffic congestion.[169]

The New Suburbanism

The new urbanist city, would be only marginally more dense than today's spacious city in which travel patterns are little different than today. The overwhelming majority of travel will continue to be by automobile. Even more than today, American urban areas would remain far below the "critical mass" that would generate significant ridership, and too dense to avoid intractable traffic congestion. As a result, consistent with the plans of Portland, the higher density will worsen traffic congestion. The simple fact is that more cars in a more compact area means more traffic and more air pollution, not less.

A more appropriate term than new urbanism might be the "new suburbanism." At most, new urbanist policies will produce small islands of somewhat higher density in a sea of low density suburbs. New urbanist policies could hasten the coming of a new suburbanization, with a much less dense urban sprawl than has already been experienced. More people are likely to choose to live outside the urban growth boundary, in smaller communities, which will gradually become larger and more urban. More businesses are likely to locate outside major urban areas. Residents inside urban growth boundaries will make longer journeys to shop at the new, larger retail establishments in exurban areas.

New urbanist policies are being proposed at the very time that information technology (such as the Internet) threatens to make urban centers less important. Already, major urban centers have few advantages over medium and smaller sized urban areas. Generally, these smaller areas have virtually everything that major centers have except for international airports.

Previous generations of urban planners have imposed their visions of a better city, through policies such as urban renewal and building high rise public housing. These planners believed in their theories just as devoutly as do today's new urbanists. It is not impossible that analysts a quarter of a century from now will characterize the new urbanism as being as anti-city as any policies in the past.

[169] Randall Crane, "Travel by Design," *Access: Research at the University of California Transportation Center*, Spring 1998.

APPENDIX C: TRANSIT AND THE MARKET [170]

Background

Public policy favors competition over monopoly: Public policy in the U.S. and other developed nations relies upon the competitive market to establish the price and quality of goods and services in the private sector. In the market, customer preferences drive the prices of competitive firms lower, while maintaining or improving product quality. At the same time, public policy seeks to avoid monopoly.

Governments grant private monopolies only where they perceive there to be no alternative. But because monopoly raises consumers prices and limits production, governments subject private monopolies to regulation to replicate the lower costs and higher quality that would be produced by the competitive market if monopoly were avoidable. Further, government seeks to eliminate private monopolies where technology advances or other factors make it feasible. Thus, governments have converted monopolistic industries such as long distance telecommunications to competition. And governments are beginning to convert electric utilities and local telephone service to competition. Similarly, governments around the world have converted regulated oligopolistic industries to competition (such as airlines, rail transport, and intercity buses).

However, government's approach to monopolies it owns is different: government monopolies are typically not subjected to regulation. This is evident in public transit. In recent decades, most public transit systems in the developed world have become public monopolies. Herbert Morrison articulated the public purpose government transit operation. In connection with establishing the London Transport organization in 1933, Morrison expected that the public good would be served by two fundamental advantages of public ownership (Morrison's view was adopted in the United States as legislators and other public officials took public transit systems into public ownership):

- A publicly owned transit agency would be able to maximize the amount of service provided to the public by being more efficient. This would be accomplished by not requiring the publicly owned transit agency to earn a profit for investors, and by exempting it from taxation.

- Employees and managers of the publicly owned transit agency would be driven by the public interest, rather than the profit motive. As a result, it

[170] Adapted from Wendell Cox, Jean Love and Nick Newton, *Competition in Public Transport: International State of the Art*, paper presented to the 5th International Conference on Competition in Passenger Transport (Leeds, UK), May 1997.

> was expected that the publicly owned transit agency would be more productive.

There is no room in this philosophy for the situation in which the public transit agency spends more than necessary to deliver service, since such performance would artificially limit the ability of government to fund necessary programs both in transit and other sectors.

But, on balance, public operation has fallen short of the promise. Considerable evidence has developed demonstrating that government monopolies are subject to the same pitfalls as private monopolies. Both types of monopolies tend to produce services for more than necessary (at above competitive rates), and service quality is often inferior. Moreover transit has been prone to use its monopoly power to address non-transport purposes, such as labor or fiscal policies.

The trend toward competitive government: Governments have begun to recognize the drawbacks of government monopoly and are turning to service delivery mechanisms that improve public performance through the injection of competition, through privatization. In public transit the most frequently used privatization strategy has been competitive contracting.

The purpose of privatization is public service. Moreover, the benefits of competitive contracting do not demonstrate that the private sector is superior to the public sector, they rather demonstrate that ***competition is superior to monopoly.*** Public agencies have demonstrated time and again their ability to improve efficiency and effectiveness in competitive situations as they have competed in the competitive market for contracts.

In transit, public agencies have routinely responded to competitive contracting proposals by claiming that their costs are so low that it is impossible to purchase the same level and quality of services from the competitive market. It is to be expected that public agencies with a stake in the status quo will be resistant to change. However, lower public (non-competitive) costs have not materialized in any case where competitive contracting was delegated to an objective third party (such as a unit of government without authority to directly operate service). As Nobel Laureate economist Frederik A. Hayek noted:

> *the competitive price cannot be known until there is competition.*

Competitive Contracting in Transit

Governments are converting entire public transit systems (bus and rail) to competitive contracting to reduce unit costs to market rates. Competitive contracting is being used to keep fares affordable, maintain or expand services,

and maintain the competitive position of transit relative to the automobile (in the less developed world, most public transit services are operated by private entrepreneurs without government subsidy).

The transit agency purchases transit services from the competitive market, awarding service contracts to the lowest responsible and responsive public or private proposer. The transit agency retains full control over policy, routes, schedules, fares, vehicle livery, and service standards. Virtually all policy and service decisions are the prerogative of the public agency. Contractors simply provide the services specified by the public agency at the fares specified by the public agency. To the customer, the transit system remains an integrated whole with no apparent changes.

- Public agencies may competitively contract transit routes, regions, operating facilities, or specialized services (such as paratransit).

- Vehicles and capital facilities may be publicly or competitively provided. Where contractors provide capital assets, transit reserves can be reduced.

Transit agencies may competitively contract public transit routes, regions, operating facilities, or specialized services (such as door-to-door service for the disabled). Competitive contracting can be used as a strategy to achieve competitive costs for an entire transit system, or it can be used to achieve competitive costs for a specified portion of a transit system ("ad hoc"). Most international competitive contracting involves system conversion, while most U.S. cases have been "ad hoc."

Competitive contracting is not deregulation --- services remain under the full policy control of public authorities. Nor is competitive contracting a reversion to the former private monopoly approach that preceded the public takeover of transit. Unlike these approaches, competitive contracting relies on publicly managed competition.

Savings

Competitive contracting lowers costs both directly and indirectly.

Direct Savings: Direct savings are the difference between the non-competitive cost of operating a service and the market based cost established through competitive contracting. Direct savings may occur from award of contracts to either private firms or public transit agencies, which then produce services at market rates. The direct savings from competitive contracting have been from 20 percent to 60 percent compared to the costs of the non-competitive services replaced.

Indirect Savings: Indirect savings occur in remaining non-competitive services in response to competition or the genuinely perceived threat of competition.

Higher Tax Revenues: Governments also gain financially from the higher tax revenues that are paid by private contractors. Public transit operators, unlike private companies, are typically exempt from most taxes.

The best results have been obtained where there is "separation of policy from operations" --- where contracting is administered by an organization other than the public transit operator. Separation of policy from operations has become routine, to ensure fair administration of the contracting process (an organization with operating division that competes for contracts cannot objectively administer the contract process). Policy is separated from operations in virtually all cases cited except Denver (Figure 82 Table C-1).

TABLE C-1
SUMMARY OF COMPETITIVE CONTRACTING RESULTS

System	Period	% Converted	Total Costs	Service Level	Unit Costs	Annual Unit Cost Change
Auckland	1990-96	100%	-21.2%	16.5%	-33.5%	-7.6%
Denver	1988-95	25%	3.0%	25.6%	-18.0%	-2.8%
Indianapolis	1994-96	70%	8.5%	38.4%	25.9%	-13.9%
Copenhagen	1989-96	56%	-18.5%	5.0%	-22.3%	-3.5%
Las Vegas	1993-94	100%	135.0%	243.0%	-33.3%	-33.3%
London	1985-97	57%	-29.5%	24.0%	-50.0%	-5.6%
San Diego	1970-96	37%	2.7%	46.6%	-30.0%	-2.1%
Stockholm	1992-95	59%	-18.5%	2.8%	-20.3%	-7.3%

All costs inflation adjusted.

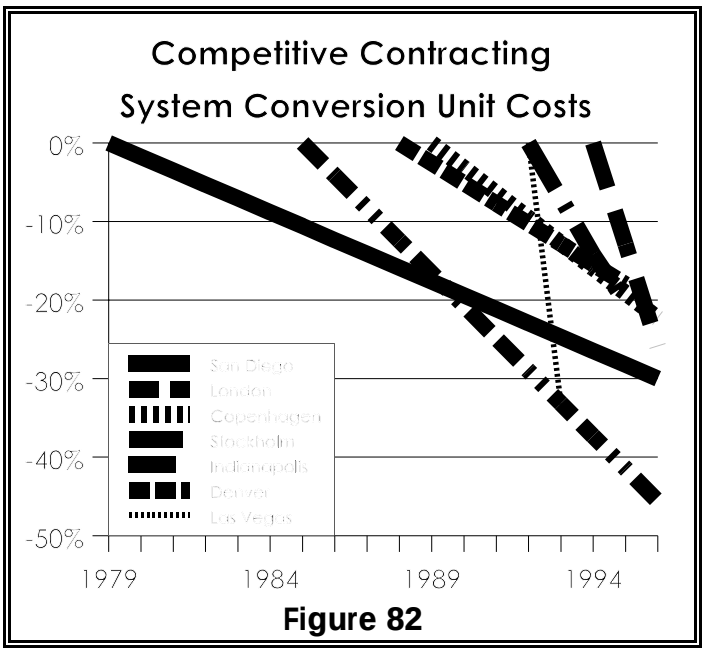

Figure 82

Geographical Extent

North America: Approximately 10 percent of fixed route and more than 70 percent of door-to-door service is competitively contracted in the United States. In addition, 30 percent of U.S. school bus service and more than 50 percent of Canadian school bus services is contracted. All suburban bus service is competitively contracted in Montreal, while smaller public transit systems are competitively contracted in British Columbia, Alberta, Saskatchewan and Ontario. More than 1,000 buses operate commercially into New York city from New Jersey.

Europe: The European Union is encouraging conversion of public transit systems to competitive contracting:

> *... the concession system (competitive contracting) - where services are subject to open contract but within a defined operational framework - is well suited to providing an environment which gives incentives to operators to raise standards whilst safeguarding system integration which is particularly important to urban and regional transport. The Commission ... will look at ways of promoting the concession (competitive contracting) system.*

Australia: Conversions are underway or completed in Melbourne, Adelaide and Perth. Under a federal-state agreement, virtually all public transit services could be converted to competitive contracting by early in the next decade under a federal-state agreement intended to improve public resource allocation and international competitiveness by subjecting public services to competition.

New Zealand: New Zealand public transit systems have been converted to a regulatory system similar to that of the UK outside London, most services are competitively contracted.

South Africa: South Africa is implementing a program to convert all public transit services to competitive contract over the next three years.

Examples

London: London is converting its entire bus system to competitive contracting. London Transport (LT) has the developed world's largest public transit bus system with more than 5.000 buses and carrying 1.25 billion annual linked trips.[171] Under a parliamentary mandate, LT has competitively contracted 57 percent of its bus services. During 1997, competitive contracting was expanded to approximately 80 percent; conversion to 100 percent will be completed in 1999. Nearly 40 companies provide service under more than 150 competitive contracts. LT usually competitively contracts by transit route but has competitively contracted areas as well. Policy is separated from operations.[172]

- Services have been expanded 24 percent over 12 years (1985-1997), while total operating expenses have been reduced 30.0 percent (inflation adjusted).

- Costs per vehicle mile have dropped 50 percent, an annual cost per mile reduction of 5.6 percent.

- The public operator won more than half of the competitive contracts until it was divided into eleven firms and sold to private investors (including management and employee buyouts). These companies continue to operate most of the service, but at market rates.

Copenhagen: Copenhagen is converting all of its bus service to competitive contracting. Copenhagen Transport administers a public transit system of 1,100 buses, carrying 190 million annual linked trips. The Danish parliament has mandated that the Copenhagen public transit bus system be converted to competitive contracting. Copenhagen now competitively contracts 56 percent of its system and will convert the balance by 2002. More than 20 operators provide service under competitive contracts. The rate paid for non-competitive services (provided until conversion by the former public monopoly) is limited to the average rate paid to contractors. Copenhagen Transport

[171] Transfers not counted.

[172] Calculated from data supplied by London Transport and the United Kingdom Department of Transport.

credits competitive contracting with reversing its falling ridership trend. Policy is separated from operations.[173]

- From 1989 to 1996, total operating costs declined by 18.5 percent (inflation adjusted), while bus services were expanded by five percent.

- Bus costs per mile have declined by 22.3 percent (inflation adjusted).

Stockholm: Stockholm is converting all of its bus and rail services to competitive contracting. Stockholm's public transit system consists of 2,000 buses and 900 rail cars. Annual ridership is 570 million linked trips. The Swedish parliament enacted public transit reforms that led to a national conversion to competitive contracting. As of 1995, Stockholm competitively contracts approximately 60 percent of both its bus services and its rail services (metro, light rail, and commuter rail). Remaining non-competitive services will be competitively contracted in the near future. According to the public transit agency, "Quality has, at a minimum, been retained unchanged." Policy is separated from operations.[174]

- Competitively contracted bus services are 32 percent less costly than non-competitive services.

- Since beginning the conversion, total bus operating costs have declined 18.5 percent (inflation adjusted), while bus services have been expanded by 2.8 percent (1992-1995).

- Bus costs per mile have declined 20.3 percent in three years.

Melbourne: The Victoria state government competitively contracted the Melbourne bus system in 1993. Cost savings have been achieved and the government has been able to avoid the expense of renewing the bus fleet (which is being undertaken under the service contract). The light rail system will soon be competitively contracted. At the same the remaining private monopoly operators are being required to reduce their costs to market rates or have their service competitively contracted.[175]

Auckland: The impacts of Auckland's conversion were delayed by a national government policy that allowed the former public monopoly operator a 25 percent preference in first round competitive contracts (the policy applied only to Auckland). With the second round now complete, service levels have increased 16.5 percent from 1990, while overall costs have declined by 21.2

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[173] Calculated from data supplied by HT (Copenhagen Transport).

[174] Calculated from AB Storstockholms Localtrafik data (Stockholm public transit authority).

[175] Information provided by the Department of Transport, state of Victoria.

percent --- a 33.5 percent reduction in cost per mile.[176]

San Diego: San Diego has converted 37 percent of its bus system to competitive contracting since 1979. San Diego is continuing its conversion at a rate that guarantees the jobs of present public transit agency employees (there have been no layoffs). More than 100 buses are now competitively contracted. Policy is separated from operations.

- Competitively contracted costs per vehicle mile are 50 percent below 1979 costs and 34 percent below the non-competitive costs of the public operator.

- In the competitive environment, system-wide bus costs per vehicle hour have dropped 30 percent (inflation adjusted). From 1979 to 1996, bus costs were $475 million less than if costs had risen at industry rates. This is nearly $100 million more than San Diego spent to build its first *two* light rail lines (inflation adjusted).

- System-wide bus costs have risen three percent, which has made it possible to increase service levels by 47 percent since 1979.

- "Ripple effect" savings have reduced the costs of non-competitive (former public monopoly) service by 25 percent per vehicle hour (inflation adjusted).

- The former public monopoly (San Diego Transit) has won competitive contracts by substantially reducing its costs.

Las Vegas: Fast growing Las Vegas has converted its entire public transit system from private monopoly operation to competitive contracting --- the first such complete conversion in a major U.S. urban area. Las Vegas operates 190 buses and carried 35 million unlinked trips in 1996, with 40 million projected for 1997.[177] Ridership has risen by approximately 300 percent since competitive contracting began, placing Las Vegas among the top 25 U.S. urban areas in public transit ridership.

- The 100 percent conversion of the Las Vegas public transit system was immediate. In the first year of operation, total operating expenditures rose 135 percent, while service levels were increased by 243 percent.

- Costs per vehicle hour dropped 33.3 percent (inflation adjusted).

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[176] Calculated from Auckland Regional Council data.

[177] Based upon trend through August 1997.

Indianapolis: Indianapolis competitively contracts 70 percent of its bus system. This was made possible through state legislation that placed state public transit subsidies under the control of the city of Indianapolis, rather than the public transit agency. Using its funding leverage, the city has placed the entire system under a "mobility manager," by which separation of policy from operations has been established. (The mobility manager is a consulting firm that oversees public transit service contracts for the city of Indianapolis.) The public operator won a major contract by an immediate cost per hour reduction of 22 percent. Since beginning competitive contracting, Indianapolis has increased bus service levels by 38.4 percent, while total operating costs have increased only 8.5 percent (1994 to 1996, inflation adjusted).

Denver: A 1988 Colorado state law required a partial conversion (20 percent) of Denver's Regional Transportation District (RTD) bus service. The success of the program has induced RTD to expand competitive contracting to 25 percent of its system. More than 180 buses are now competitively contracted. Policy is *not* separated from operations.

- Annual cost savings were 33 percent through 1994 and are increasing. RTD's most recent procurement yielded a savings of 41 percent and will produce $25 million in savings over five years (approximately 60 buses).

- Since beginning competitive contracting, RTD has increased bus service levels by 25.6 percent, while operating costs have increased only 3.0 percent (1988 to 1995, inflation adjusted). In contrast, during the six years before competitive contracting, operating costs rose 18.8 percent, while service levels were increased by 17.5 percent.

- "Ripple effect" savings have reduced the costs of non-competitive (former public monopoly) service by 11 percent per hour (inflation adjusted).

- From 1988 to 1995, bus costs were than $120 million less than if costs had continued to rise at the previous rate.

Los Angeles: Public transit operators in the Los Angeles have recently reached the 20 percent competitive contracting level, consisting of approximately 550 buses (the largest number of competitively contracted buses of any U.S. urban area). In the late 1980s, Los Angeles competitively contracted public transit routes that were threatened with cancellation as a result of financial constraints. Ridership on the competitively contracted routes increased 150 percent in contrast with the overall downward trend in Los Angeles. In an independent audit, Price Waterhouse reported:

- Cost savings of 60 percent savings per mile.

- Better service quality: An improvement in service reliability of over 300 percent, a 75 percent reduction in passenger complaints, and virtually the same safety performance relative to the public operator.

In addition, fares on the competitively contracted services have been kept lower than on the regional system because of the lower costs. Policy is separated from operations.

APPENDIX D: LIGHT RAIL: NON-TRANSPORTATION BENEFITS

Light rail has been credited with non-transportation benefits, such as improving the civic "psyche" and generating commercial and residential development. Downtown oriented metropolitan newspapers have often editorialized about positive civic psychological benefits of light rail systems.[178]

Frequently cited cases are:

- Portland, where it is claimed that light rail played an important part in the placement of a new basketball arena (the "Rose Garden") and a new convention center in central Portland. Moreover, the renovation and expansion of a regional shopping center (Lloyd Center) has also been cited as a result of light rail.

- St. Louis, where it is claimed that light rail was important in the placement of a new domed football stadium (the "TWA Dome"), a new basketball and hockey arena ("Kiel Center") and a new convention center[179] in the downtown area.

On closer examination, however, the light rail development claims are less persuasive.

- All of the sports facilities cited above were partially or fully tax funded --- arising from decisions of government, not by decisions of private investors who were attracted to develop land along light rail lines. Publicly assisted sports facilities may be built anywhere in a community, and have been built in both central city and suburban areas. Two new sports facilities are planned in central Detroit, which has no rail system. Major sports facilities have recently or will be sited in the central areas of other non-light rail cities, including Phoenix, Seattle, Minneapolis, Indianapolis, and Charlotte. It is notable that in Washington, D.C., with the nation's most effective new urban rail system,[180] the new football stadium (Jack Kent Cooke Stadium) was constructed beyond walking distance from the rail system.

- Convention centers are routinely developed with tax subsidies, and the

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[178] Such as *The Dallas Morning News*, the Portland *Oregonian*, the *St. Louis Post-Dispatch*, and the *Denver Post.*

[179] *Dollars & Sense.*

[180] Washington's heavy rail Metro system carries one-half of the ridership of all new rail systems in the nation and 15 times the ridership of the most heavily patronized new light rail system.

largest are invariably built in or near downtowns, adjacent to hotels[181] and downtown shopping. For example, major convention centers have been built in the central areas of Detroit, Seattle, Kansas City, Indianapolis, Milwaukee, San Antonio, and Los Angeles (long before construction of urban rail became a serious prospect).

There are further indications of the difficulty of attracting private investment to light rail lines. Because there has been little high density private development adjacent to most light rail stations, the city of Portland is offering 10 years of property tax forgiveness for qualifying projects within walking distance (1/4 mile) of light rail stations. This demonstrates light rail's minuscule impact on development. If light rail drove development it would not be necessary to subsidize the private development along the route.

The tax supported development in central city areas does not represent a net gain to the urban areas (from other urban areas) --- the projects would have been built somewhere within the same urban area. The critical element in any resulting development is not light rail --- it is tax subsidies.

Downtown Employment and Vacancies: If new urban rail were able to reshape city development, it would be expected that downtowns in new rail cities would have lower office vacancy rates than in other cities, and rates that are lower than suburban areas. Yet, the average downtown vacancy rate in new rail cities is more than half again higher than the average of other cities (June 1998).

- In eight of 13 new rail cities for which data is available, the downtown office vacancy rate is higher than that of the other cities.

- In eight of the 13 new rail cities for which data is available, the downtown office vacancy rate is higher than that of the adjacent suburbs (Figure 83).

[181] In recent years, convention oriented downtown hotels have been developmed increasingly with tax subsidies.

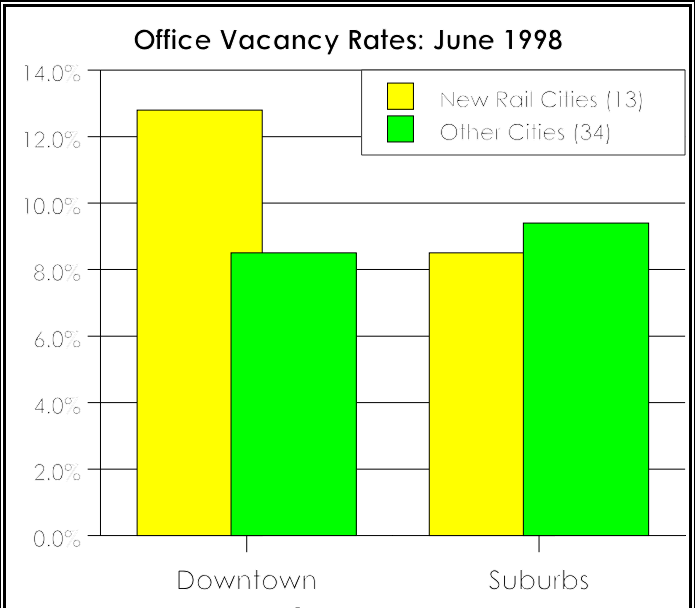

Figure 83
Calculated from CB Richard Ellis June 1998 data.

The downtowns of some new light rail cities are experiencing considerable difficulty.

- Portland's central city employment has increased by 1,000 from 1990 to 1994, while suburban employment grew by nearly 94,000. The central city share of metropolitan employment fell by nine percent over the period.[182] Further, the city of Portland government has recently relaxed parking development restrictions to make downtown more competitive,[183] and at least three major multi-story parking structures have recently been under construction along the rail line. A downtown area that had been transformed by light rail would have an excess, not a shortage of parking.

- Downtown St. Louis has been characterized as "fading fast."[184] A major downtown enclosed shopping center --- which the developer claimed to be the largest in the nation when it opened in 1985 --- may close.[185] The downtown office vacancy rate is more than 1.5 times the national average and more than double the St. Louis suburban vacancy rate.

- Dallas, continues to have one of the nation's highest downtown office

182 "The Central City 2000 Strategy" recommendations of the Central City Task Force - July 23, 1996.

183 "Portland Lifts Limits on Parking Spaces," *The Oregonian*, October 2, 1997.

184 "Special Report: Downtown St. Louis: Fading Fast, *St. Louis Post-Dispatch*, December 8, 1996.

185 "St. Louis Centre's Owner Considers Cutting Losses, Abandoning Mall," *St. Louis Post-Dispatch*, January 25, 1998.

vacancy rates --- nearly triple that of its suburbs. At 31.9 percent, (December 1998[186]) the Dallas downtown vacancy rate is 46th out of 47 markets and 1.8 times that of nearby downtown Fort Worth, which is not served by light rail (Figure 84). Dallas is one of only five downtown areas with a vacancy rate exceeding 20 percent. National downtown vacancy rates have declined at a rate more than seven times that of downtown Dallas' rate since before light rail opened. Downtown Fort Worth's vacancy rate dropped at more than double the downtown Dallas rate (Figure 85).[187]

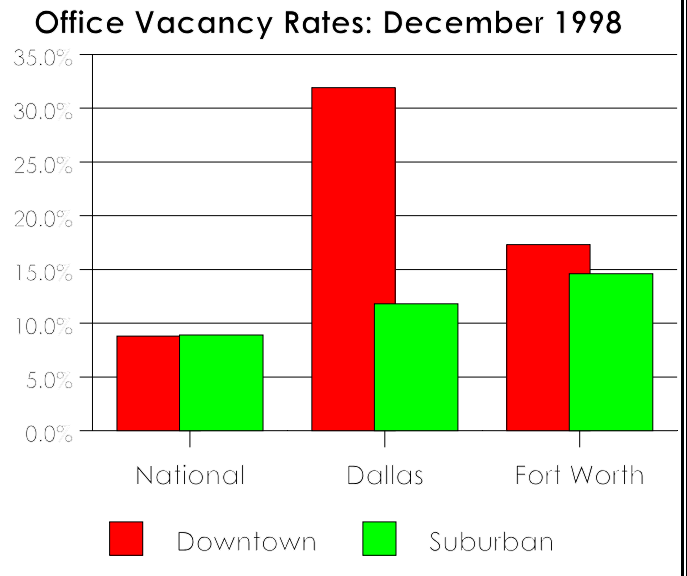

Figure 84
Calculated from CB Richard Ellis data.

[186] Latest data available.

[187] All vacancy information from CB Richard Ellis, (Internet: http://www.cbcommercial.com).

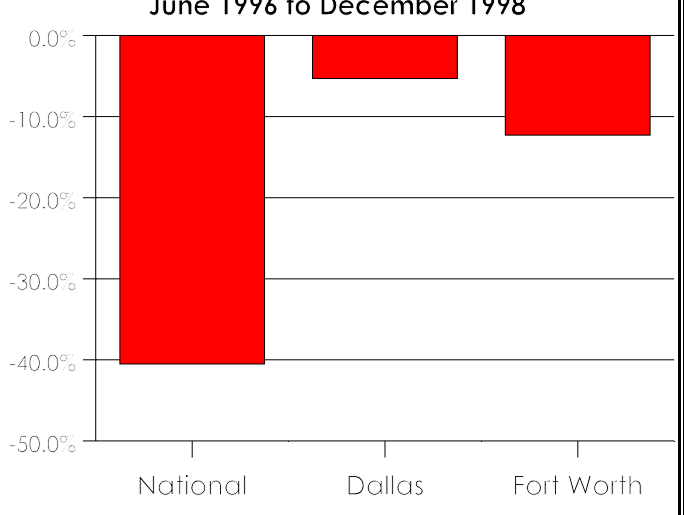

Figure 85
Calculated from CB Richard Ellis data.

If new rail were an effective city shaper, the cities that have made the greatest investments would have become more dense and less automobile dependent. But, the two cities that have built the most extensive rail systems,[188] Washington and Atlanta, have experienced greater than average sprawl[189] and significant declines in public transit work trip market share since rail was opened.

The Dallas Experience

Nonetheless, development impacts have been noted with respect to the DART light rail system, especially in central area residential development. The increasing popularity of the central Dallas area for residences mirrors a trend that is occurring in both rail and non-rail cities. Moreover, one of the two most impressive central city residential recurrences (Denver) is occurring well away from that city's light rail line.[190] The ultimate evaluation of light rail's impact upon Dallas will require years of experience. It will also require comparison of the Dallas experience with that of Dallas suburban areas not served by light rail and with the experience in other cities.

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188 Washington and Atlanta account for two-thirds of the nation's new rail ridership (out of 20 new systems).

189 The Sierra Club cited Atlanta's urban sprawl trend as the "most threatening" in the nation in a 1998 report analyzing trends since 1990. Washington was ranked third. Light rail urban area St. Louis was ranked second.

190 "A Rise in Downtown Living," (Washington: The Brookings Institution Center on Urban and Metropolitan Policy and the Fannie Mae Foundation), November 1998.

It is likely that Dallas development induced by light rail will, as in other areas before it, be of a very localized rather than regional significance. Whatever the ultimate impact upon the civic "psyche" or development, the fact will remain that DART's rail program, which was sold to the community as a strategy for containing traffic congestion, will have virtually no such impact, because it is so slow and serves such a small percentage of origin and destination pairs.

APPENDIX E: TABLES

TABLE E-1
TREND IN TRANSIT RIDERSHIP (BOARDINGS): 1970 TO 1995

Year	Population	Total Boardings	Annual Trips Per Capita*
1970	203,984,000	7,591,000,000	37.2
1975	215,465,000	7,232,000,000	33.6
1980	227,225,000	8,532,000,000	37.5
1985	237,924,000	8,276,000,000	34.8
1990	249,402,000	7,735,000,000	31.0
1995	263,034,000	7,306,000,000	27.8
1996	265,284,000	7,371,000,000	27.8

**** Annual Trips Per Capita: Total Annual Ridership divided by Population***
Data includes Motor bus, trolley bus, heavy rail, light rail and commuter rail.

Source: Calculated from U.S. Department of Transportation & American Public Transit Association data.

TABLE E-2
PER CAPITA INCOME: 1996

Area	Income	Compared to National	Rank out of 46 Areas
National Metropolitan	$25,820	0.0%	
Texas	**$23,656**	**-8.4%**	
Austin	**$23,669**	**-8.3%**	**38**
Dallas-Fort Worth	**$26,906**	**4.2%**	**14**
Houston	**$26,556**	**2.9%**	**15**
San Antonio	**$21,237**	**-17.7%**	**45**

Source: Survey of Current Business, September 1998.

TABLE E-3
CHANGE IN ROADWAY CONGESTION INDEX: 1982-1996
URBAN AREAS OF MORE THAN 500,000 IN 1996

Rank	Urbanized Area	Roadway Congestion Index		Change
		1982	1996	
1	**Houston TX**	**1.17**	**1.11**	**-5.1%**
2	Phoenix AZ	1.15	1.14	-0.9%
3	Philadelphia PA-NJ	1.00	1.07	7.0%
4	Jacksonville FL	0.91	0.99	8.8%
5	Pittsburgh PA	0.78	0.85	9.0%
6	San Bernardino-Riverside CA	1.11	1.22	9.9%
7	New Orleans LA	0.98	1.09	11.2%
8	Tampa FL	0.94	1.06	12.8%
9	Providence-Pawtucket RI-MA	0.84	0.96	14.3%
10	New York NY-Northeastern NJ	1.01	1.18	16.8%

TABLE E-3
CHANGE IN ROADWAY CONGESTION INDEX: 1982-1996
URBAN AREAS OF MORE THAN 500,000 IN 1996

Rank	Urbanized Area	Roadway Congestion Index		Change
		1982	1996	
11	Detroit MI	1.06	1.24	17.0%
12	Tucson AZ	0.87	1.02	17.2%
13	Fresno CA	0.66	0.78	18.2%
14	Ft. Lauderdale-Hollywood-Pompano Bch FL	0.87	1.03	18.4%
15	Buffalo-Niagara Falls NY	0.65	0.78	20.0%
16	Honolulu HI	0.91	1.10	20.9%
17	Boston MA	0.90	1.09	21.1%
18	Norfolk VA	0.79	0.96	21.5%
19	Hartford-Middletown CT	0.76	0.93	22.4%
20	**Austin TX**	**0.84**	**1.03**	**22.6%**
21	Milwaukee WI	0.83	1.03	24.1%
22	Cincinnati OH-KY	0.86	1.07	24.4%
23	Oklahoma City OK	0.72	0.91	26.4%
24	Orlando FL	0.72	0.91	26.4%
25	St. Louis MO-IL	0.83	1.05	26.5%
26	**El Paso TX-NM**	**0.63**	**0.80**	**27.0%**
27	Denver CO	0.88	1.12	27.3%
28	Cleveland OH	0.80	1.02	27.5%
29	Miami-Hialeah FL	1.05	1.34	27.6%
30	Washington DC-MD-VA	1.12	1.43	27.7%
31	**San Antonio TX**	**0.77**	**0.99**	**28.6%**
32	Los Angeles CA	1.22	1.57	28.7%
33	San Jose CA	0.86	1.11	29.1%
34	Albuquerque NM	0.78	1.01	29.5%
35	Baltimore MD	0.84	1.09	29.8%
36	Nashville TN	0.77	1.00	29.9%
37	Kansas City MO-KS	0.62	0.81	30.6%
38	Chicago IL-Northwestern IN	1.02	1.34	31.4%
39	San Francisco-Oakland CA	1.01	1.33	31.7%
40	**Dallas TX**	**0.84**	**1.11**	**32.1%**
41	**Fort Worth TX**	**0.76**	**1.01**	**32.9%**
42	Portland-Vancouver OR-WA	0.87	1.16	33.3%
43	Louisville KY-IN	0.78	1.04	33.3%
44	Seattle-Everett WA	0.95	1.27	33.7%
45	Memphis TN-AR-MS	0.83	1.11	33.7%
46	Sacramento CA	0.80	1.07	33.8%
47	Atlanta GA	0.91	1.24	36.3%
48	Omaha NE-IA	0.73	1.00	37.0%
49	Charlotte NC	0.71	0.98	38.0%
50	Minneapolis-St. Paul MN	0.76	1.12	47.4%

TABLE E-3
CHANGE IN ROADWAY CONGESTION INDEX: 1982-1996
URBAN AREAS OF MORE THAN 500,000 IN 1996

Rank	Urbanized Area	Roadway Congestion Index		Change
		1982	1996	
51	Tacoma WA	0.80	1.18	47.5%
52	Columbus OH	0.68	1.01	48.5%
53	Indianapolis IN	0.67	1.00	49.3%
54	Rochester NY	0.57	0.87	52.6%
55	San Diego CA	0.78	1.23	57.7%
56	Salt Lake City UT	0.63	1.00	58.7%
57	Las Vegas NV	0.73	1.20	64.4%
Average		0.85	1.07	26.5%

TABLE E-4
BOARDINGS BY METROPOLITAN AREA: 1980-1996

Rank	Boardings	Boardings in Millions			Change		Annual Rate
		1980	1990	1996	1980-96	1990-96	1980-96
1	New York-NNJ-Long Island	2,976.4	2,810.2	2,647.3	-11.1%	-5.8%	-0.73%
2	Chicago-Gary-Kenosha	789.8	697.5	549.8	-30.4%	-21.2%	-2.24%
3	Los Angeles-Riverside-Orange Co	480.6	525.9	520.3	8.3%	-1.1%	0.50%
4	San Francisco-Oakland-San Jose	538.3	456.5	451.9	-16.0%	-1.0%	-1.09%
5	Washington-Baltimore	422.1	489.1	444.1	5.2%	-9.2%	0.32%
6	Philadelphia-Wilmington-Atlantic City	395.5	371.8	327.2	-17.3%	-12.0%	-1.18%
7	Boston-Worcester-Lawrence	267.5	341.1	323.6	21.0%	-5.1%	1.20%
8	Atlanta	120.2	149.5	147.7	22.9%	-1.2%	1.30%
9	Seattle-Tacoma-Bremerton	98.2	100.8	115.5	17.6%	14.5%	1.02%
10	Miami-Ft. Lauderdale	85.1	91.5	102.3	20.3%	11.8%	1.16%
11	**Houston-Galveston-Brazoria**	**46.9**	**91.1**	**81.3**	**73.3%**	**-10.8%**	**3.50%**
12	Portland-Salem	50.3	60.9	79.8	58.7%	30.9%	2.93%
13	San Diego	44.2	67.1	76.3	72.8%	13.7%	3.48%
14	Pittsburgh	108.6	86.7	72.6	-33.1%	-16.2%	-2.48%
15	Cleveland-Akron	134.4	81.1	71.4	-46.9%	-12.0%	-3.88%
16	Denver-Boulder-Greeley	46.9	55.7	69.8	48.7%	25.4%	2.51%
17	Honolulu	74.1	73.5	69.1	-6.7%	-6.0%	-0.43%
18	New Orleans	103.5	82.3	65.3	-36.9%	-20.6%	-2.83%
19	Detroit-Ann Arbor-Flint	129.6	100.7	64.8	-50.0%	-35.6%	-4.24%
20	Milwaukee	88.0	67.9	63.4	-28.0%	-6.6%	-2.03%
21	**Dallas-Ft. Worth**	**45.2**	**55.5**	**62.4**	**38.2%**	**12.4%**	**2.04%**
22	Minneapolis-St. Paul	105.2	69.6	61.9	-41.2%	-11.0%	-3.26%
23	St. Louis	84.2	44.4	51.6	-38.8%	16.3%	-3.02%
24	Las Vegas	4.9	7.4	38.3	682.2%	420.2%	13.72%
25	**San Antonio**	**36.9**	**41.9**	**37.7**	**2.2%**	**-10.0%**	**0.13%**

TABLE E-4
BOARDINGS BY METROPOLITAN AREA: 1980-1996

Rank	Boardings	Boardings in Millions			Change		Annual Rate 1980-96
		1980	1990	1996	1980-96	1990-96	
26	Phoenix-Mesa	14.3	31.1	33.2	132.5%	7.0%	5.41%
27	Cincinnati-Hamilton	43.3	35.3	29.9	-31.0%	-15.2%	-2.29%
28	**Austin**	**7.2**	**32.0**	**28.1**	**289.4%**	**-12.2%**	**8.87%**
29	Buffalo-Niagara Falls	37.1	30.4	27.6	-25.5%	-9.0%	-1.82%
30	Sacramento-Yolo	17.0	20.4	27.3	61.0%	34.0%	3.02%
31	Salt Lake City-Ogden	19.1	23.7	23.8	24.9%	0.6%	1.40%
32	Providence-Fall River-Warwick	28.5	21.5	19.3	-32.4%	-10.7%	-2.42%
33	Columbus	20.0	18.3	17.6	-12.4%	-4.3%	-0.82%
34	Tampa-St. Petersburg-Clearwater	18.9	19.7	16.3	-13.6%	-17.2%	-0.91%
35	Hartford	21.2	20.8	16.0	-24.2%	-22.8%	-1.72%
36	Norfolk-Virginia Bch-Newport News	22.2	13.5	15.0	-32.3%	11.1%	-2.41%
37	Orlando	5.7	8.0	15.0	163.9%	86.8%	6.25%
38	Kansas City	26.2	18.5	14.4	-45.1%	-22.5%	-3.68%
39	Rochester	25.5	15.2	12.8	-49.8%	-15.7%	-4.21%
40	Indianapolis	16.4	12.6	12.2	-25.6%	-3.2%	-1.84%
41	Memphis	24.4	13.9	11.9	-51.2%	-14.0%	-4.38%
42	Charlotte-Gastonia-Rock Hill	10.2	12.1	11.5	12.4%	-5.0%	0.74%
43	Raleigh-Durham-Chapel Hill	3.7	4.1	9.2	147.4%	124.6%	5.82%
44	Jacksonville	16.7	8.8	8.4	-49.8%	-5.0%	-4.21%
45	Nashville	18.0	8.6	7.8	-56.8%	-9.9%	-5.11%
46	Greensboro-Winston Salem-High Point	5.0	5.9	5.5	8.5%	-6.6%	0.51%
47	Oklahoma City	2.6	3.5	3.3	29.2%	-5.8%	1.62%
48	Grand Rapids-Muskegon-Holland	4.8	4.3	3.3	-31.9%	-24.0%	-2.37%

Table includes all metropolitan areas with more than 1,000,000 population in 1996, plus Honolulu which is the only metropolitan area below 1,000,000 with more than 20 annual per capita rides.

Source: Calculated from U.S. Department of Transportation National Transit Database data.

TABLE E-5
ANNUAL PER CAPITA BOARDINGS BY METROPOLITAN AREA: 1980-1990-1996

Rank	Metropolitan Area	Year			Change		Rail System?	
		1980	1990	1996	1980-96	1990-96	Old	New
1	New York-NNJ-Long Island	169.7	143.7	132.8	-21.8%	-7.6%	l	
2	Honolulu	97.1	87.9	79.2	-18.4%	-9.9%		
3	San Francisco-Oakland-San Jose	100.3	73.0	68.4	-31.8%	-6.3%	l	l
4	Chicago-Gary-Kenosha	99.5	84.6	63.9	-35.8%	-24.5%	l	
5	Washington-Baltimore	77.4	72.7	62.0	-20.0%	-14.7%		l
6	Boston-Worcester-Lawrence	67.3	62.5	58.2	-13.6%	-7.0%	l	

TABLE E-5
ANNUAL PER CAPITA BOARDINGS BY METROPOLITAN AREA: 1980-1990-1996

Rank	Metropolitan Area	Year			Change		Rail System?	
		1980	1990	1996	1980-96	1990-96	Old	New
7	Philadelphia-Wilmington-Atlantic City	69.6	63.1	54.8	-21.3%	-13.2%	l	
8	New Orleans	82.4	64.0	49.8	-39.6%	-22.3%	l	
9	Atlanta	56.2	50.5	41.7	-25.8%	-17.5%		l
10	Milwaukee	56.1	42.2	38.6	-31.2%	-8.6%		
11	Portland-Salem	38.7	34.0	38.4	-0.9%	13.0%		l
12	Seattle-Tacoma-Bremerton	46.9	34.0	34.8	-25.9%	2.4%		
13	Los Angeles-Riverside-Orange Co	41.8	36.2	33.6	-19.7%	-7.2%		l
14	Las Vegas	10.6	8.6	31.9	201.5%	269.3%		
15	Denver-Boulder-Greeley	29.0	28.1	30.7	5.7%	9.0%		l
16	Pittsburgh	44.8	36.2	30.5	-31.9%	-15.7%	l	
17	Miami-Ft. Lauderdale	32.2	28.7	29.1	-9.5%	1.6%		l
18	San Diego	23.7	26.9	28.7	21.1%	7.0%		l
19	**Austin**	**13.5**	**37.9**	**27.0**	**100.5%**	**-28.6%**		
20	**San Antonio**	**34.5**	**31.6**	**25.3**	**-26.5%**	**-20.0%**		
21	Cleveland-Akron	47.4	28.4	24.5	-48.4%	-13.6%	l	
22	Buffalo-Niagara Falls	29.8	25.5	23.5	-21.2%	-7.9%		l
23	Minneapolis-St. Paul	49.2	27.4	22.4	-54.5%	-18.3%		
24	St. Louis	35.4	17.8	20.2	-42.9%	13.7%		l
25	Salt Lake City-Ogden	21.0	22.1	19.6	-6.7%	-11.4%		
26	**Houston-Galveston-Brazoria**	**15.1**	**24.4**	**19.1**	**26.3%**	**-21.7%**		
27	Providence-Fall River-Warwick	26.3	19.0	17.1	-34.9%	-9.8%		
28	Sacramento-Yolo	15.4	13.8	16.7	8.5%	21.6%		l
29	Cincinnati-Hamilton	26.1	19.4	15.6	-40.4%	-19.7%		
30	Hartford	20.9	17.9	14.0	-32.9%	-21.9%		
31	**Dallas-Ft. Worth**	**15.4**	**13.8**	**13.6**	**-11.5%**	**-0.8%**		**l**
32	Detroit-Ann Arbor-Flint	27.3	19.4	12.3	-55.0%	-36.8%		
33	Columbus	16.1	13.6	12.1	-24.7%	-11.1%		
34	Phoenix-Mesa	9.5	13.9	12.1	27.7%	-12.8%		
35	Rochester	26.3	14.3	11.8	-55.2%	-17.7%		
36	Memphis	26.7	13.8	11.1	-58.6%	-19.7%		
37	Orlando	8.1	6.6	10.6	30.4%	61.4%		
38	Norfolk-Virginia Bch-Newport News	19.2	9.4	9.8	-49.0%	4.2%		
39	Raleigh-Durham-Chapel Hill	7.0	4.8	9.0	28.1%	88.1%		
40	Charlotte-Gastonia-Rock Hill	10.5	10.4	8.7	-17.4%	-16.4%		
41	Kansas City	18.3	11.7	8.5	-53.5%	-27.4%		
42	Jacksonville	22.6	9.7	8.3	-63.2%	-14.6%		
43	Indianapolis	14.0	9.1	8.2	-41.9%	-10.4%		
44	Tampa-St. Petersburg-Clearwater	11.7	9.5	7.4	-36.6%	-22.1%		
45	Nashville	21.1	8.8	6.9	-67.1%	-20.6%		

TABLE E-5
ANNUAL PER CAPITA BOARDINGS BY METROPOLITAN AREA: 1980-1990-1996

Rank	Metropolitan Area	Year			Change		Rail System?	
		1980	1990	1996	1980-96	1990-96	Old	New
46	Greensboro-Winston Salem-High Point	5.9	5.6	4.8	-19.0%	-14.1%		
47	Grand Rapids-Muskegon-Holland	6.2	4.6	3.3	-47.5%	-29.8%		
48	Oklahoma City	3.0	3.7	3.2	8.4%	-12.1%		
Major Metropolitan Areas		35.7	29.5	26.9	-24.8%	-9.1%		

Table includes all metropolitan areas with more than 1,000,000 population in 1996, plus Honolulu which is the only metropolitan area below 1,000,000 with more than 20 annual per capita rides.

Old rail systems are those that opened after 1975.

Source: Calculated from U.S. Department of Transportation National Transit Database and American Public Transit Association data.

TABLE E-6
METROPOLITAN AREAS RANKED BY CHANGE IN ANNUAL BOARDINGS PER CAPITA: 1980 TO 1996

Rank	Transit Agency	Change	Rail System?	
			Old	New
1	Las Vegas	201.5%		
2	**Austin**	**100.5%**		
3	Orlando	30.4%		
4	Raleigh-Durham-Chapel Hill	28.1%		
5	Phoenix-Mesa	27.7%		
6	**Houston-Galveston-Brazoria**	**26.3%**		
7	San Diego	21.1%		l
8	Sacramento-Yolo	8.5%		l
9	Oklahoma City	8.4%		
10	Denver-Boulder-Greeley	5.7%		l
11	Portland-Salem	-0.9%		l
12	Salt Lake City-Ogden	-6.7%		
13	Miami-Ft. Lauderdale	-9.5%		l
14	**Dallas-Ft. Worth**	**-11.5%**		**l**
15	Boston-Worcester-Lawrence	-13.6%	l	
16	Charlotte-Gastonia-Rock Hill	-17.4%		
17	Honolulu	-18.4%		
18	Greensboro-Winston Salem-High Point	-19.0%		
19	Los Angeles-Riverside-Orange Co	-19.7%		l
20	Washington-Baltimore	-20.0%		l
21	Buffalo-Niagara Falls	-21.2%		l
22	Philadelphia-Wilmington-Atlantic City	-21.3%		
23	New York-NNJ-Long Island	-21.8%	l	

TABLE E-6
METROPOLITAN AREAS RANKED BY CHANGE IN ANNUAL BOARDINGS PER CAPITA: 1980 TO 1996

Rank	Transit Agency	Change	Rail System? Old	Rail System? New
24	Columbus	-24.7%		
25	Atlanta	-25.8%		l
26	Seattle-Tacoma-Bremerton	-25.9%		
27	**San Antonio**	**-26.5%**		
28	Milwaukee	-31.2%		
29	San Francisco-Oakland-San Jose	-31.8%	l	l
30	Pittsburgh	-31.9%	l	
31	Hartford	-32.9%		
32	Providence-Fall River-Warwick	-34.9%		
33	Chicago-Gary-Kenosha	-35.8%	l	
34	Tampa-St. Petersburg-Clearwater	-36.6%		
35	New Orleans	-39.6%	l	
36	Cincinnati-Hamilton	-40.4%		
37	Indianapolis	-41.9%		
38	St. Louis	-42.9%		l
39	Grand Rapids-Muskegon-Holland	-47.5%		
40	Cleveland-Akron	-48.4%	l	
41	Norfolk-Virginia Bch-Newport News	-49.0%		
42	Kansas City	-53.5%		
43	Minneapolis-St. Paul	-54.5%		
44	Detroit-Ann Arbor-Flint	-55.0%		
45	Rochester	-55.2%		
46	Memphis	-58.6%		
47	Jacksonville	-63.2%		
48	Nashville	-67.1%		
Average		-16.6%		

Table includes all metropolitan areas with more than 1,000,000 population in 1996, plus Honolulu which is the only metropolitan area below 1,000,000 with more than 20 annual per capita rides.

Old rail systems are those that opened after 1975.

Source: Calculated from U.S. Department of Transportation National Transit Database and American Public Transit Association data.

TABLE E-7 RANKING BY RATIO OF SERVICE TO POPULATION: 1996 MAJOR METROPOLITAN AREAS		
Rank	**Metropolitan Area**	**Annual Vehicle Hours per Capita**
1	New York-NNJ-Long Island	2.432
2	San Francisco-Oakland-San Jose	1.559
3	Honolulu	1.456
4	Chicago-Gary-Kenosha	1.439
5	Seattle-Tacoma-Bremerton	1.318
6	Washington-Baltimore	1.243
7	Portland-Salem	1.108
8	Denver-Boulder-Greeley	1.051
9	Milwaukee	1.034
10	Pittsburgh	1.025
11	New Orleans	1.011
12	Philadelphia-Wilmington-Atlantic City	0.959
13	**San Antonio**	**0.933**
14	Boston-Worcester-Lawrence	0.931
15	Atlanta	0.900
16	Salt Lake City-Ogden	0.893
17	**Austin**	**0.887**
18	Miami-Ft. Lauderdale	0.866
19	San Diego	0.856
20	Cleveland-Akron	0.842
21	Buffalo-Niagara Falls	0.805
22	Los Angeles-Riverside-Orange Co	0.781
23	Las Vegas	0.775
24	Minneapolis-St. Paul	0.764
25	St. Louis	0.733
26	**Houston-Galveston-Brazoria**	**0.682**
27	Providence-Fall River-Warwick	0.668
28	Cincinnati-Hamilton	0.586
29	**Dallas-Ft. Worth**	**0.545**
30	Orlando	0.485
31	Columbus	0.482
32	Hartford	0.476
33	Jacksonville	0.470
34	Detroit-Ann Arbor-Flint	0.463
35	Norfolk-Virginia Bch-Newport News	0.450
36	Rochester	0.448
37	Sacramento-Yolo	0.446
38	Memphis	0.443

TABLE E-7
RANKING BY RATIO OF SERVICE TO POPULATION: 1996
MAJOR METROPOLITAN AREAS

Rank	Metropolitan Area	Annual Vehicle Hours per Capita
39	Tampa-St. Petersburg-Clearwater	0.415
40	Phoenix-Mesa	0.396
41	Raleigh-Durham-Chapel Hill	0.354
42	Kansas City	0.350
43	Indianapolis	0.308
44	Charlotte-Gastonia-Rock Hill	0.296
45	Nashville	0.260
46	Grand Rapids-Muskegon-Holland	0.206
47	Greensboro-Winston Salem-High Point	0.197
48	Oklahoma City	0.155
Average		0.754

Table includes all metropolitan areas with more than 1,000,000 population in 1996, plus Honolulu which is the only metropolitan area below 1,000,000 with more than 20 annual per capita rides.

Source: Calculated from U.S. Department of Transportation National Transit Database data.

TABLE E-8
RANKING BY PASSENGER MILES PER VEHICLE MILE: 1996
TRANSIT AGENCIES WITH 100 OR MORE BUSES

1	Honolulu-DTS	16.26
2	LA-Santa Monica	15.58
3	NY-Westchester	15.02
4	SF-Golden Gate	13.79
5	San Francisco-Muni	13.78
6	LA-LACMTA-Metro	13.78
7	NY-MTA-NYCTA	13.55
8	New Orleans-RTA	12.75
9	NY-New York City DOT	12.60
10	NY-MTA-Long Island Bus	11.80
11	Seattle-Metro	11.72
12	**El Paso-Sun Metro**	**11.55**
13	San Diego Transit	11.50
14	Baltimore-Maryland-MTA	11.13
15	Philadelphia-SEPTA	10.97
16	LA-Foothill Transit	10.92
17	Chicago-RTA-CTA	10.78

TABLE E-8 RANKING BY PASSENGER MILES PER VEHICLE MILE: 1996 TRANSIT AGENCIES WITH 100 OR MORE BUSES		
18	Boston-MBTA	10.46
19	SF-Oakland-AC Transit	10.35
20	Ft. Lauderdale-Bct	10.34
21	SF-SamTrans	9.98
22	Miami-MDTA	9.49
23	Cincinnati-SORTA	9.48
24	Seattle-Snohomish-Commun.	9.45
25	Washington-WMATA	9.43
26	Phoenix PTD	9.43
27	LA-OCTA	9.41
28	New Jersey Transit	9.34
29	LA-Long Beach Transit	9.26
30	Portland-Tri-Met	9.13
31	Milwaukee-County	9.03
32	Detroit-D-DOT	8.89
33	Orlando-LYNX	8.87
34	Sacramento-RT	8.79
35	**Houston-Metro**	**8.78**
36	Minneapolis-St. Paul-MCTO	8.62
37	Memphis-MATA	8.60
38	Pittsburgh-PAT	8.37
39	San Jose-SCCTD	8.07
40	San Bernardino-OMNITRANS	7.96
41	Flint-MTA	7.95
42	Tucson-Sun Tran	7.93
43	Indianapolis-Metro	7.90
44	**Dallas-Fort Worth-DART**	**7.86**
45	Denver-RTD	7.78
46	Hartford-CT Transit	7.77
47	Providence-RIPTA	7.70
48	Madison-MMT	7.65
49	San Diego-NCTD	7.56
50	Charlotte-CTS	7.54
51	Tacoma-Pierce Transit	7.52
52	Nashville-MTA	7.43
53	Springfield-PVTA	7.41
54	Syracuse-RTA-Centro	7.40
55	Columbus-COTA	7.39
56	Chicago-RTA-Pace	7.36
57	Atlanta-MARTA	7.33
58	Cleveland-RTA	7.32
59	Albany-CDTA	7.22

TABLE E-8 RANKING BY PASSENGER MILES PER VEHICLE MILE: 1996 TRANSIT AGENCIES WITH 100 OR MORE BUSES		
60	Richmond-GRTC	7.19
61	Newport News-Pentran	7.14
62	Buffalo-NFTA	7.12
63	**Austin-Capital Metro**	**7.11**
64	**San Antonio-VIA**	**7.11**
65	Louisville-TARC	6.77
66	San Diego-SANDAG	6.74
67	Washington-Maryland-Ride-On	6.70
68	Rochester-RTS	6.62
69	Jacksonville-JTA	6.57
70	Norfolk-TRT	6.55
71	LA-City of Los Angeles	6.35
72	Detroit-SMART	6.31
73	Kansas City-KCATA	6.15
74	St. Louis-Bi-State	5.97
75	Spokane-STA	5.90
76	Tampa-Hartline	5.86
77	**Dallas-Fort Worth-The T**	**5.71**
78	Salt Lake City-UTA	5.52
79	St. Petersburg-PSTA	5.42
80	Albuquerque-Sun Tran	5.15
81	Omaha-TA	4.83
82	Toledo-TARTA	4.78
83	NY-Hauppage-Suffolk Trans	4.77
84	Dayton-RTA	3.74
85	Akron-Metro	3.34
86	West Palm Beach-CoTran	2.87
Average		8.5
Source: Calculated from National Transit Database.		

TABLE E-9 CENTRAL BUSINESS DISTRICT DATA: 1990							
Rank	**Metropolitan Area**	**Employment Center**	**Transit Market Share**	**Employees in Metropolitan Area**	**Employees in CBD**	**CBD Share of Metropol-itan Market**	**CBD Public Transit Commuters**
1	New York	New York	74.0%	9,357,218	1,733,269	18.5%	1,283,457
2	Chicago	Chicago	60.7%	3,870,378	336,313	8.7%	204,068
3	New York	Brooklyn	56.4%	9,357,218	104,312	1.1%	58,869
4	San Francisco	San Francisco	50.3%	3,153,201	184,254	5.8%	92,652
5	Boston	Boston	49.3%	2,182,115	148,400	6.8%	73,176
6	Philadelphia	Philadelphia	44.0%	2,433,682	247,945	10.2%	109,177

TABLE E-9
CENTRAL BUSINESS DISTRICT DATA: 1990

Rank	Metropolitan Area	Employment Center	Transit Market Share	Employees in Metropolitan Area	Employees in CBD	CBD Share of Metropol-itan Market	CBD Public Transit Commuters
7	Washington	Washington	37.0%	2,362,448	324,056	13.7%	119,958
8	Seattle	Seattle	36.2%	1,409,497	94,421	6.7%	34,149
9	Pittsburgh	Pittsburgh	33.4%	965,310	114,814	11.9%	38,387
10	Minneapolis-St. Paul	Minneapolis	24.4%	1,307,624	128,395	9.8%	31,277
11	Baltimore	Baltimore	24.1%	1,125,264	127,682	11.3%	30,816
12	New York	Newark	23.2%	9,357,218	13,423	0.1%	3,113
13	San Francisco	Oakland	22.4%	3,153,201	32,800	1.0%	7,362
14	Cleveland	Cleveland	21.3%	1,271,745	106,899	8.4%	22,765
15	Portland	Portland	20.0%	847,793	95,734	11.3%	19,153
16	**Houston**	**Houston**	**16.9%**	**1,779,289**	**127,759**	**7.2%**	**21,640**
17	Buffalo	Buffalo	16.9%	534,871	54,828	10.3%	9,271
18	Denver	Denver	16.7%	982,659	107,773	11.0%	17,947
19	Cincinnati	Cincinnati	16.6%	828,139	77,198	9.3%	12,805
20	Minneapolis-St. Paul	St. Paul	16.5%	1,307,624	40,278	3.1%	6,662
21	Honolulu	Honolulu	16.0%	438,271	132,656	30.3%	21,173
22	Atlanta	Atlanta	15.9%	1,469,298	112,654	7.7%	17,890
23	New Orleans	New Orleans	15.2%	515,264	93,292	18.1%	14,171
24	Los Angeles	Los Angeles	14.3%	6,813,757	288,142	4.2%	41,073
25	**Dallas-Fort Worth**	**Dallas**	**13.9%**	**2,009,838**	**112,452**	**5.6%**	**15,612**
26	Milwaukee	Milwaukee	13.8%	828,601	86,457	10.4%	11,958
27	Tampa	St. Petersburg	13.3%	880,146	29327	3.3%	3,886
28	Providence	Providence	13.3%	506,135	29,327	5.8%	3,886
29	Columbus	Columbus	12.8%	706,215	39,852	5.6%	5,088
30	**Austin**	**U of Texas**	**12.4%**	**416,780**	**26,161**	**6.3%**	**3,241**
31	Rochester	Rochester	12.1%	483,182	40,057	8.3%	4,853
32	Miami	Miami	12.0%	1,474,533	41,214	2.8%	4,960
33	San Diego	San Diego	11.9%	1,215,758	48,166	4.0%	5,733
34	Detroit	Detroit	11.4%	2,071,395	74,339	3.6%	8,439
35	St. Louis	St. Louis	10.5%	1,157,017	101,749	8.8%	10,656
36	Charlotte	Charlotte	10.4%	634,924	68,368	10.8%	7,140
37	Sacramento	Sacramento	10.4%	726,116	68,368	9.4%	7,140
38	Salt Lake City	Salt Lake City	8.7%	484,810	46,078	9.5%	4,007
39	Hartford	Hartford	8.0%	603,402	29,435	4.9%	2,362
40	**San Antonio**	**San Antonio**	**7.9%**	**582,416**	**47,651**	**8.2%**	**3,788**
41	Kansas City	Kansas City	7.7%	788,089	56,901	7.2%	4,396
42	Los Angeles	Long Beach	6.2%	6,813,757	34,620	0.5%	2,163
43	Phoenix	Phoenix	5.4%	998,114	83,746	8.4%	4,542

TABLE E-9
CENTRAL BUSINESS DISTRICT DATA: 1990

Rank	Metropolitan Area	Employment Center	Transit Market Share	Employees in Metropolitan Area	Employees in CBD	CBD Share of Metropol-itan Market	CBD Public Transit Commuters
44	Indianapolis	Indianapolis	5.3%	651,123	85,799	13.2%	4,558
45	San Francisco	San Jose	5.2%	3,153,201	29,100	0.9%	1,510
46	Tampa	Tampa	5.2%	880,146	30,526	3.5%	1,581
47	**Austin**	**CBD Less UT**	**4.8%**	**416,780**	**52,299**	**12.5%**	**2,496**
48	Norfolk	Norfolk	3.6%	708,503	36,277	5.1%	1,295
49	Tacoma	Tacoma	3.4%	1,409,497	35,953	2.6%	1,213
50	Miami	Ft. Lauderdale	3.0%	2,071,395	33,843	1.6%	1,028
51	**Dallas-Fort Worth**	**Fort Worth**	**2.2%**	**2,009,838**	**29,041**	**1.4%**	**640**
52	Orlando	Orlando	1.8%	590,850	39,700	6.7%	705
Totals & Averages			38.6%	102,095,645	6,264,103	6.1%	2,419,887

Source: Calculated from U.S. Census Bureau data.

TABLE E-10
JOURNEY TO WORK MARKET SHARE: 1990

Area	SOV	Car Pool	Transit	Walk	Home	Other
Downtown	67.0%	17.9%	13.9%	0.5%	0.0%	0.7%
Dallas Outside Downtown	77.4%	14.5%	3.4%	1.9%	1.7%	1.1%
Addison	85.1%	11.3%	1.6%	1.0%	0.5%	0.5%
Carrollton	82.8%	13.5%	0.7%	0.8%	1.1%	0.9%
Cockrell Hill	73.7%	14.0%	2.1%	2.8%	7.4%	0.0%
Farmers Branch	85.2%	12.0%	0.5%	0.7%	1.1%	0.6%
Garland	79.3%	13.6%	1.0%	1.7%	3.5%	0.9%
Glenn Heights	67.2%	5.0%	0.0%	0.0%	27.8%	0.0%
Highland Park	68.7%	13.0%	5.3%	1.0%	11.5%	0.4%
Irving	82.3%	12.7%	0.8%	1.6%	1.7%	0.8%
Dallas County-Unincorporated	74.1%	19.1%	1.9%	1.2%	0.8%	2.9%
Richardson	84.0%	11.0%	0.8%	0.9%	2.2%	1.1%
Rowlett	78.0%	12.5%	0.0%	1.2%	6.7%	1.6%
University Park	67.4%	12.0%	4.3%	9.9%	5.4%	1.1%
Plano	82.4%	11.2%	0.4%	1.3%	3.6%	1.1%
DART Area	78.0%	14.1%	3.5%	1.6%	1.8%	1.0%
Dallas PMSA: Outside DART	77.4%	14.5%	0.1%	2.7%	4.1%	1.3%
Fort Worth PMSA	80.2%	13.7%	0.7%	1.8%	2.4%	1.2%
Dallas-Fort Worth CMSA	78.6%	14.1%	2.2%	1.8%	2.2%	1.1%

Calculated from U.S. Census Bureau Data.

TABLE E-11
TRANSIT AGENCIES RANKED BY OVERALL BUS & RAIL OPERATING COST PER PASSENGER MILE: 1996
ALL AGENCIES OPERATING RAIL AND AGENCIES OPERATING 100 OR MORE BUSES

Rank	Transit Agency	Cost per Passenger Mile	Labor Market Adjustment	Labor Market Adjusted Cost per Passenger Mile	Modes
1	Washington-Virginia Railway Express	$0.204	1.105	$0.184	CR
2	NY-MTA-Metro North RR	$0.246	1.281	$0.192	CR
3	San Diego-Trolley	$0.187	0.962	$0.194	LR
4	NW IN-NICTD	$0.219	1.057	$0.207	CR
5	LA-Foothill Transit	$0.221	1.054	$0.210	MB
6	NY-MTA-Long Island RR	$0.274	1.281	$0.214	CR
7	Chicago-RTA-Metra	$0.242	1.057	$0.229	CR
8	LA-Santa Monica	$0.264	1.054	$0.251	MB
9	NY-MTA-NYCTA	$0.344	1.281	$0.269	HR MB
10	SF-CalTrain	$0.315	1.135	$0.277	CR
11	LA-SCRRA	$0.293	1.054	$0.278	CR
12	SF-Golden Gate	$0.322	1.135	$0.284	MB
13	Honolulu-DTS	$0.311	1.057	$0.294	MB
14	NY-Westchester	$0.395	1.281	$0.308	MB
15	Atlanta-MARTA	$0.333	1.035	$0.322	HR MB
16	Ft. Lauderdale-TCRA	$0.302	0.889	$0.339	CR
17	Philadelphia-Penn DOT	$0.379	1.074	$0.353	CR
18	New Jersey Transit	$0.410	1.158	$0.354	CR LR MB
19	Boston-MBTA	$0.391	1.075	$0.364	CR HR LR MB TB
20	Seattle-Snohomish-Commun.	$0.406	1.099	$0.369	MB
21	San Diego Transit	$0.357	0.962	$0.371	MB
22	**El Paso-Sun Metro**	**$0.269**	**0.722**	**$0.373**	**MB**
23	Memphis-MATA	$0.365	0.956	$0.381	LR MB
24	Washington-WMATA	$0.447	1.105	$0.404	HR MB
25	San Diego-SANDAG	$0.392	0.962	$0.408	MB
26	Indianapolis-Metro	$0.444	1.082	$0.410	MB
27	Cincinnati-SORTA	$0.425	1.031	$0.412	MB
28	Flint-MTA	$0.479	1.162	$0.412	MB
29	SF-SamTrans	$0.486	1.135	$0.428	MB
30	Tucson-Sun Tran	$0.357	0.817	$0.438	MB
31	Seattle-Metro	$0.481	1.099	$0.438	LR MB TB
32	Orlando-LYNX	$0.397	0.907	$0.438	MB
33	Chicago-RTA-CTA	$0.470	1.057	$0.445	HR MB
34	Ft. Lauderdale-Bct	$0.397	0.889	$0.446	MB
35	Detroit-SMART	$0.521	1.162	$0.449	MB

TABLE E-11
TRANSIT AGENCIES RANKED BY OVERALL BUS & RAIL OPERATING COST PER PASSENGER MILE: 1996
ALL AGENCIES OPERATING RAIL AND AGENCIES OPERATING 100 OR MORE BUSES

Rank	Transit Agency	Cost per Passenger Mile	Labor Market Adjustment	Labor Market Adjusted Cost per Passenger Mile	Modes
36	Newport News-Pentran	$0.375	0.832	$0.451	MB
37	Portland-Tri-Met	$0.480	1.064	$0.451	LR MB
38	Phoenix PTD	$0.418	0.926	$0.452	MB
39	St. Louis-Bi-State	$0.481	1.063	$0.453	LR MB
40	**Houston-Metro**	**$0.457**	**0.995**	**$0.459**	**MB**
41	Philadelphia-SEPTA	$0.496	1.074	$0.462	CR HR LR MB TB
42	San Diego-NCTD	$0.445	0.962	$0.463	CR MB
43	Tacoma-Pierce Transit	$0.511	1.099	$0.465	MB
44	NY-MTA-Long Island Bus	$0.525	1.117	$0.470	MB
45	LA-LACMTA-Metro	$0.501	1.054	$0.475	HR LR MB
46	Nashville-MTA	$0.469	0.966	$0.485	MB
47	LA-OCTA	$0.515	1.054	$0.488	MB
48	NY-Hauppage-Suffolk Trans	$0.546	1.117	$0.489	MB
49	Milwaukee-County	$0.527	1.078	$0.489	MB
50	**San Antonio-VIA**	**$0.410**	**0.837**	**$0.490**	**MB**
51	Minneapolis-St. Paul-MCTO	$0.521	1.054	$0.495	MB
52	Chicago-RTA-Pace	$0.523	1.057	$0.495	MB
53	Denver-RTD	$0.483	0.973	$0.496	LR MB
54	Baltimore-Maryland-MTA	$0.491	0.988	$0.497	CR HR LR MB
55	LA-Long Beach Transit	$0.527	1.054	$0.500	MB
56	Sacramento-RT	$0.509	1.017	$0.501	MB
57	SF-Oakland-AC Transit	$0.575	1.135	$0.507	MB
58	NY-New York City DOT	$0.650	1.281	$0.507	MB
59	Charlotte-CTS	$0.498	0.968	$0.515	MB
60	San Bernardino-OMNITRANS	$0.430	0.835	$0.516	MB
61	Springfield-PVTA	$0.472	0.907	$0.521	MB
62	Richmond-GRTC	$0.544	1.038	$0.524	MB
63	Miami-MDTA	$0.471	0.889	$0.529	HR MB
64	New Orleans-RTA	$0.455	0.855	$0.532	LR MB
65	San Francisco-Muni	$0.607	1.135	$0.535	LR MB TB
66	Hartford-CT Transit	$0.588	1.079	$0.545	MB
67	Providence-RIPTA	$0.494	0.904	$0.546	MB
68	Louisville-TARC	$0.562	1.024	$0.549	MB
69	Albany-CDTA	$0.532	0.949	$0.560	MB
70	**Austin-Capital Metro**	**$0.534**	**0.949**	**$0.563**	**MB**
71	LA-City of Los Angeles	$0.594	1.054	$0.564	MB

TABLE E-11
TRANSIT AGENCIES RANKED BY OVERALL BUS & RAIL OPERATING COST PER PASSENGER MILE: 1996
ALL AGENCIES OPERATING RAIL AND AGENCIES OPERATING 100 OR MORE BUSES

Rank	Transit Agency	Cost per Passenger Mile	Labor Market Adjustment	Labor Market Adjusted Cost per Passenger Mile	Modes
72	Salt Lake City-UTA	$0.512	0.901	$0.568	MB
73	Norfolk-TRT	$0.474	0.832	$0.569	MB
74	Washington-Maryland-Ride-On	$0.630	1.105	$0.570	MB
75	Jacksonville-JTA	$0.503	0.872	$0.577	MB
76	Pittsburgh-PAT	$0.590	1.018	$0.580	MB
77	Columbus-COTA	$0.618	1.050	$0.589	MB
78	Cleveland-RTA	$0.626	1.023	$0.612	MB
79	**Dallas-Fort Worth-The T**	**$0.572**	**0.933**	**$0.613**	**MB**
80	**Dallas-Fort Worth-DART**	**$0.645**	**0.933**	**$0.692**	**LR MB**
81	Detroit-D-DOT	$0.770	1.162	$0.663	MB
82	Omaha-TA	$0.653	0.945	$0.690	MB
83	Madison-MMT	$0.623	0.899	$0.694	MB
84	San Jose-SCCTD	$0.803	1.135	$0.708	LR MB
85	Rochester-RTS	$0.710	1.000	$0.710	MB
86	Buffalo-NFTA	$0.799	1.116	$0.716	LR MB
87	Tampa-Hartline	$0.626	0.873	$0.718	MB
88	St. Petersburg-PSTA	$0.654	0.873	$0.750	MB
89	Kansas City-KCATA	$0.764	1.015	$0.753	MB
90	Syracuse-RTA-Centro	$0.713	0.914	$0.780	MB
91	Albuquerque-Sun Tran	$0.677	0.854	$0.792	MB
92	Toledo-TARTA	$0.796	0.919	$0.866	MB
93	Spokane-STA	$0.717	0.811	$0.885	MB
94	Hartford-Conn DOT	$0.967	1.079	$0.896	MB
95	Akron-Metro	$0.994	1.023	$0.972	MB
96	Dayton-RTA	$1.115	1.077	$1.036	MB TB
97	West Palm Beach-CoTran	$1.096	0.964	$1.138	MB
System Average				$0.504	

Modes: CR: Commuter Rail; HR: Heavy Rail; LR: Light Rail; MB: Motor Bus; TB: Trolley Bus.
Calculated from National Transit Database and U.S. Department of Labor data.[191]

[191] Labor Market factor estimated for each area using clerical and "blue collar" data from the following sources:

1. 1996 U.S. Department of Labor Occupational Compensation Survey (34 job categories)
2. 1993 U.S. Department of Labor Occupational Compensation Survey for areas not in 1996 survey (41 job categories)
3. 1996 U.S. Department of Labor Metropolitan Salaries for areas in neither 1996 nor 1993 survey
4. New Jersey factor estimated using average of New York, Nassau-Suffolk and Philadelphia factors

Labor Market factor weighting: 78.3 percent

TABLE E-12
RANKING BY LABOR MARKET ADJUSTED BUS OPERATING COST PER PASSENGER MILE: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Rank	Transit Agency	Cost/ Passenger Mile	Labor Market Factor	Labor Market Adjusted Cost	Compared to Benchmark* ($0.269)
1	LA-Foothill Transit	$0.221	105.4%	$0.210	-22.1%
2	LA-Santa Monica	$0.264	105.4%	$0.251	-6.8%
3	SF-Golden Gate	$0.322	113.5%	$0.284	5.4%
4	Honolulu-DTS	$0.311	105.7%	$0.294	9.1%
5	NY-Westchester	$0.395	128.1%	$0.308	14.5%
6	Memphis-MATA	$0.349	95.6%	$0.365	35.7%
7	Seattle-Snohomish-Commun.	$0.406	109.9%	$0.369	37.1%
8	San Diego Transit	$0.357	96.2%	$0.371	37.7%
9	**El Paso-Sun Metro**	**$0.269**	**72.2%**	**$0.373**	**38.4%**
10	San Diego-NCTD	$0.380	96.2%	$0.395	46.6%
11	Seattle-Metro	$0.438	109.9%	$0.399	48.1%
12	San Diego-SANDAG	$0.392	96.2%	$0.408	51.4%
13	Indianapolis-Metro	$0.444	108.2%	$0.410	52.3%
14	Cincinnati-SORTA	$0.425	103.1%	$0.412	53.0%
15	Flint-MTA	$0.479	116.2%	$0.412	53.2%
16	SF-SamTrans	$0.486	113.5%	$0.428	59.1%
17	Tucson-Sun Tran	$0.357	81.7%	$0.438	62.5%
18	Orlando-LYNX	$0.397	90.7%	$0.438	62.7%
19	Ft. Lauderdale-Bct	$0.397	88.9%	$0.446	65.8%
20	Detroit-SMART	$0.521	116.2%	$0.449	66.6%
21	Newport News-Pentran	$0.375	83.2%	$0.451	67.4%
22	New Jersey Transit	$0.523	115.8%	$0.452	67.8%
23	Phoenix PTD	$0.418	92.6%	$0.452	67.9%
24	**Houston-Metro**	**$0.457**	**99.5%**	**$0.459**	**70.4%**
25	Tacoma-Pierce Transit	$0.511	109.9%	$0.465	72.6%
26	LA-LACMTA-Metro	$0.491	105.4%	$0.466	73.1%
27	Portland-Tri-Met	$0.500	106.4%	$0.470	74.5%
28	NY-MTA-Long Island Bus	$0.525	111.7%	$0.470	74.5%
29	Nashville-MTA	$0.469	96.6%	$0.485	80.2%
30	LA-OCTA	$0.515	105.4%	$0.488	81.3%
31	NY-Hauppage-Suffolk Trans	$0.546	111.7%	$0.489	81.6%
32	Milwaukee-County	$0.527	107.8%	$0.489	81.6%
33	**San Antonio-VIA**	**$0.410**	**83.7%**	**$0.490**	**82.1%**
34	Denver-RTD	$0.480	97.3%	$0.493	83.2%
35	Minneapolis-St. Paul-MCTO	$0.521	105.4%	$0.495	83.7%

Administrative function weighting 13.7 percent
Transportation & Operations function weighting 83.7 percent.

TABLE E-12
RANKING BY LABOR MARKET ADJUSTED BUS OPERATING COST PER PASSENGER MILE: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Rank	Transit Agency	Cost/ Passenger Mile	Labor Market Factor	Labor Market Adjusted Cost	Compared to Benchmark* ($0.269)
36	Chicago-RTA-Pace	$0.523	105.7%	$0.495	83.9%
37	LA-Long Beach Transit	$0.527	105.4%	$0.500	85.7%
38	SF-Oakland-AC Transit	$0.575	113.5%	$0.507	88.2%
39	NY-New York City DOT	$0.650	128.1%	$0.507	88.5%
40	Charlotte-CTS	$0.498	96.8%	$0.515	91.1%
41	San Bernardino-OMNITRANS	$0.430	83.5%	$0.516	91.5%
42	Springfield-PVTA	$0.472	90.7%	$0.521	93.5%
43	Richmond-GRTC	$0.544	103.8%	$0.524	94.6%
44	Baltimore-Maryland-MTA	$0.528	98.8%	$0.534	98.3%
45	New Orleans-RTA	$0.458	85.5%	$0.536	99.0%
46	Hartford-CT Transit	$0.588	107.9%	$0.545	102.4%
47	Providence-RIPTA	$0.494	90.4%	$0.546	103.0%
48	Louisville-TARC	$0.562	102.4%	$0.549	104.0%
49	San Francisco-Muni	$0.631	113.5%	$0.556	106.5%
50	Albany-CDTA	$0.532	94.9%	$0.560	108.0%
51	Miami-MDTA	$0.500	88.9%	$0.563	108.9%
52	**Austin-Capital Metro**	**$0.534**	**94.9%**	**$0.563**	**109.0%**
53	LA-City of Los Angeles	$0.594	105.4%	$0.564	109.3%
54	Salt Lake City-UTA	$0.512	90.1%	$0.568	110.9%
55	Boston-MBTA	$0.611	107.5%	$0.569	111.2%
56	Norfolk-TRT	$0.474	83.2%	$0.569	111.4%
57	Sacramento-RT	$0.579	101.7%	$0.569	111.5%
58	Washington-Maryland-Ride-On	$0.630	110.5%	$0.570	111.5%
59	Pittsburgh-PAT	$0.580	101.8%	$0.570	111.8%
60	Jacksonville-JTA	$0.503	87.2%	$0.577	114.3%
61	Columbus-COTA	$0.618	105.0%	$0.589	118.7%
62	NY-MTA-NYCTA	$0.760	128.1%	$0.593	120.4%
63	St. Louis-Bi-State	$0.639	106.3%	$0.601	123.2%
64	Chicago-RTA-CTA	$0.638	105.7%	$0.604	124.3%
65	Atlanta-MARTA	$0.625	103.5%	$0.604	124.5%
66	**Dallas-Fort Worth-The T**	**$0.572**	**93.3%**	**$0.613**	**127.7%**
67	**Dallas-Fort Worth-DART**	**$0.588**	**93.3%**	**$0.630**	**134.1%**
68	Washington-WMATA	$0.706	110.5%	$0.639	137.2%
69	Philadelphia-SEPTA	$0.693	107.4%	$0.645	139.6%
70	Detroit-D-DOT	$0.770	116.2%	$0.663	146.2%
71	Omaha-TA	$0.653	94.5%	$0.690	156.4%
72	Madison-MMT	$0.623	89.9%	$0.694	157.6%
73	San Jose-SCCTD	$0.789	113.5%	$0.695	158.2%

TABLE E-12
RANKING BY LABOR MARKET ADJUSTED BUS OPERATING COST PER PASSENGER MILE: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Rank	Transit Agency	Cost/ Passenger Mile	Labor Market Factor	Labor Market Adjusted Cost	Compared to Benchmark* ($0.269)
74	Buffalo-NFTA	$0.777	111.6%	$0.697	158.7%
75	Rochester-RTS	$0.710	100.0%	$0.710	163.8%
76	Tampa-Hartline	$0.626	87.3%	$0.718	166.6%
77	Cleveland-RTA	$0.741	102.3%	$0.724	169.0%
78	St. Petersburg-PSTA	$0.654	87.3%	$0.750	178.6%
79	Kansas City-KCATA	$0.764	101.5%	$0.753	179.6%
80	Syracuse-RTA-Centro	$0.713	91.4%	$0.780	189.8%
81	Albuquerque-Sun Tran	$0.677	85.4%	$0.792	194.3%
82	Toledo-TARTA	$0.796	91.9%	$0.866	221.6%
83	Spokane-STA	$0.717	81.1%	$0.885	228.5%
84	Akron-Metro	$0.994	102.3%	$0.972	261.0%
85	Dayton-RTA	$1.090	107.7%	$1.012	275.9%
86	West Palm Beach-CoTran	$1.096	96.4%	$1.138	322.5%

Calculated from National Transit Database.

TABLE E-13
RANKING BY LABOR MARKET ADJUSTED LIGHT RAIL OPERATING COST PER PASSENGER MILE: 1996

Rank	Transit Agency	Cost/ Passenger Mile	Labor Market Factor	Labor Market Adjusted Cost	Type of System
1	St. Louis-Bi-State	$0.198	1.063	$0.186	New
2	San Diego-Trolley	$0.187	0.962	$0.194	New
3	Portland-Tri-Met	$0.385	1.064	$0.361	New
4	Sacramento-RT	$0.380	1.017	$0.373	New
5	New Jersey Transit	$0.437	1.158	$0.378	Historic
6	LA-LACMTA-Metro	$0.419	1.054	$0.397	New
7	San Francisco-Muni	$0.515	1.135	$0.453	Historic
8	Cleveland-RTA	$0.467	1.023	$0.457	Historic
9	Philadelphia-SEPTA	$0.494	1.074	$0.460	Historic
10	New Orleans-RTA	$0.408	0.855	$0.477	Historic
11	Boston-MBTA	$0.536	1.075	$0.499	Historic
12	Baltimore-Maryland-MTA	$0.500	0.988	$0.506	New
13	**Dallas-DART**	**$0.523**	**0.933**	**$0.561**	**New**
14	Denver-RTD	$0.558	0.973	$0.573	New
15	Pittsburgh-PAT	$0.657	1.018	$0.646	Historic
16	San Jose-SCCTD	$0.884	1.135	$0.779	New
17	Buffalo-NFTA	$0.890	1.116	$0.798	New

TABLE E-13
RANKING BY LABOR MARKET ADJUSTED LIGHT RAIL OPERATING COST PER PASSENGER MILE: 1996

Rank	Transit Agency	Cost/ Passenger Mile	Labor Market Factor	Labor Market Adjusted Cost	Type of System
18	Seattle-Metro	$2.389	1.099	$2.175	Retro
19	Memphis-MATA	$2.394	0.956	$2.504	Retro

Calculated from National Transit Database.
Dallas data is for 1997, discounted to 1996 costs.
New: Opened 1980 or later.
Historic: Opened before 1980.
Retro: New system using historic vehicles (generally tourist orientation).

TABLE E-14
RANKING BY LABOR MARKET ADJUSTED BUS OPERATING COST PER VEHICLE HOUR: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Rank	Transit Agency	Cost/ Vehicle Hour	Labor Market Factor	Labor Market Adjusted Cost per Vehicle Hour	Compared to Benchmark* ($41.78)
1	San Diego-SANDAG[192]	$35.36	96.2%	$36.76	-12.0%
2	Flint-MTA	$48.43	116.2%	$41.68	-0.2%
3	NY-Hauppage-Suffolk Trans	$48.02	111.7%	$42.98	2.9%
4	Richmond-GRTC	$45.25	103.8%	$43.61	4.4%
5	LA-Foothill Transit	$46.24	105.4%	$43.87	5.0%
6	Springfield-PVTA	$39.99	90.7%	$44.12	5.6%
7	Albany-CDTA	$42.74	94.9%	$45.02	7.8%
8	Omaha-TA	$42.96	94.5%	$45.43	8.7%
9	Newport News-Pentran	$39.66	83.2%	$47.66	14.1%
10	Tucson-Sun Tran	$39.11	81.7%	$47.88	14.6%
11	Indianapolis-Metro	$52.76	108.2%	$48.76	16.7%
12	LA-City of Los Angeles	$51.41	105.4%	$48.77	16.7%
13	LA-Santa Monica	$52.07	105.4%	$49.39	18.2%
14	Louisville-TARC	$51.25	102.4%	$50.05	19.8%
15	Memphis-MATA	$48.01	95.6%	$50.21	20.2%
16	Nashville-MTA	$49.19	96.6%	$50.93	21.9%
17	Norfolk-TRT	$42.40	83.2%	$50.95	22.0%
18	Washington-Maryland-Ride-On	$56.55	110.5%	$51.16	22.4%
19	**San Antonio-VIA**	**$42.92**	**83.7%**	**$51.29**	**22.8%**

[192] San Diego's SANDAG, which has the lowest cost, is the only system that competitively contracts all of its service. Las Vegas also competitively contracts all of its service but reports only the amounts paid to the contractors, and excludes the cost of public administration. Based upon the comparatively low cost of Las Vegas competitive operation, it is likely that the benchmark would be lower if complete information were available.

TABLE E-14
RANKING BY LABOR MARKET ADJUSTED BUS OPERATING COST PER VEHICLE HOUR: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Rank	Transit Agency	Cost/ Vehicle Hour	Labor Market Factor	Labor Market Adjusted Cost per Vehicle Hour	Compared to Benchmark* ($41.78)
20	St. Louis-Bi-State	$54.87	106.3%	$51.63	23.6%
21	LA-Long Beach Transit	$54.92	105.4%	$52.10	24.7%
22	Charlotte-CTS	$51.22	96.8%	$52.89	26.6%
23	San Diego-NCTD	$50.97	96.2%	$52.99	26.8%
24	Buffalo-NFTA	$59.12	111.6%	$52.99	26.8%
25	**Dallas-Fort Worth-The T**	**$49.54**	**93.3%**	**$53.13**	**27.2%**
26	**Detroit-SMART**	**$62.22**	**116.2%**	**$53.54**	**28.2%**
27	Cincinnati-SORTA	$55.84	103.1%	$54.16	29.6%
28	Jacksonville-JTA	$47.33	87.2%	$54.29	29.9%
29	**El Paso-Sun Metro**	**$39.32**	**72.2%**	**$54.47**	**30.4%**
30	Dayton-RTA	$58.72	107.7%	$54.54	30.5%
31	San Diego Transit	$52.69	96.2%	$54.77	31.1%
32	Salt Lake City-UTA	$49.39	90.1%	$54.81	31.2%
33	Tacoma-Pierce Transit	$60.40	109.9%	$54.97	31.6%
34	Milwaukee-County	$59.69	107.8%	$55.36	32.5%
35	Orlando-LYNX	$50.27	90.7%	$55.42	32.6%
36	Akron-Metro	$57.59	102.3%	$56.32	34.8%
37	Chicago-RTA-Pace	$59.69	105.7%	$56.48	35.2%
38	Hartford-CT Transit	$61.08	107.9%	$56.58	35.4%
39	West Palm Beach-CoTran	$54.90	96.4%	$56.96	36.3%
40	Toledo-TARTA	$52.40	91.9%	$57.03	36.5%
41	**Austin-Capital Metro**	**$54.35**	**94.9%**	**$57.27**	**37.1%**
42	Rochester-RTS	$57.38	100.0%	$57.40	37.4%
43	Portland-Tri-Met	$61.46	106.4%	$57.77	38.3%
44	San Bernardino-OMNITRANS	$48.65	83.5%	$58.29	39.5%
45	Minneapolis-St. Paul-MCTO	$61.78	105.4%	$58.60	40.3%
46	Albuquerque-Sun Tran	$50.97	85.4%	$59.68	42.8%
47	Phoenix PTD	$55.35	92.6%	$59.80	43.1%
48	Atlanta-MARTA	$62.03	103.5%	$59.96	43.5%
49	SF-SamTrans	$68.66	113.5%	$60.47	44.7%
50	Tampa-Hartline	$52.77	87.3%	$60.47	44.7%
51	Columbus-COTA	$63.55	105.0%	$60.52	44.9%
52	Denver-RTD	$59.09	97.3%	$60.71	45.3%
53	St. Petersburg-PSTA	$53.20	87.3%	$60.97	45.9%
54	Kansas City-KCATA	$63.20	101.5%	$62.25	49.0%
55	NY-MTA-NYCTA	$80.22	128.1%	$62.62	49.9%
56	NY-Westchester	$80.43	128.1%	$62.78	50.3%

TABLE E-14
RANKING BY LABOR MARKET ADJUSTED BUS OPERATING COST PER VEHICLE HOUR: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Rank	Transit Agency	Cost/ Vehicle Hour	Labor Market Factor	Labor Market Adjusted Cost per Vehicle Hour	Compared to Benchmark* ($41.78)
57	**Houston-Metro**	**$62.93**	**99.5%**	**$63.22**	**51.3%**
58	Providence-RIPTA	$58.56	90.4%	$64.80	55.1%
59	Ft. Lauderdale-Bct	$57.81	88.9%	$65.03	55.6%
60	LA-OCTA	$68.62	105.4%	$65.09	55.8%
61	Boston-MBTA	$70.34	107.5%	$65.46	56.7%
62	Chicago-RTA-CTA	$69.43	105.7%	$65.71	57.3%
63	Seattle-Snohomish-Commun.	$72.36	109.9%	$65.86	57.6%
64	NY-New York City DOT	$86.05	128.1%	$67.18	60.8%
65	SF-Oakland-AC Transit	$76.29	113.5%	$67.19	60.8%
66	Pittsburgh-PAT	$68.77	101.8%	$67.58	61.8%
67	New Jersey Transit	$78.98	115.8%	$68.23	63.3%
68	Madison-MMT	$62.20	89.9%	$69.20	65.6%
69	Syracuse-RTA-Centro	$63.62	91.4%	$69.60	66.6%
70	Cleveland-RTA	$72.06	102.3%	$70.47	68.7%
71	Miami-MDTA	$62.86	88.9%	$70.71	69.3%
72	NY-MTA-Long Island Bus	$79.97	111.7%	$71.59	71.4%
73	Seattle-Metro	$78.89	109.9%	$71.80	71.8%
74	Honolulu-DTS	$76.57	105.7%	$72.44	73.4%
75	Baltimore-Maryland-MTA	$72.62	98.8%	$73.49	75.9%
76	Detroit-D-DOT	$85.39	116.2%	$73.49	75.9%
77	Washington-WMATA	$81.79	110.5%	$74.00	77.1%
78	Sacramento-RT	$75.29	101.7%	$74.02	77.2%
79	Philadelphia-SEPTA	$80.06	107.4%	$74.52	78.4%
80	Spokane-STA	$60.76	81.1%	$74.90	79.3%
81	San Francisco-Muni	$85.59	113.5%	$75.38	80.4%
82	**Dallas-Fort Worth-DART**	**$72.76**	**93.3%**	**$78.03**	**86.8%**
83	New Orleans-RTA	$66.90	85.5%	$78.21	87.2%
84	SF-Golden Gate	$91.70	113.5%	$80.76	93.3%
85	San Jose-SCCTD	$94.60	113.5%	$83.32	99.4%
86	LA-LACMTA-Metro	$89.90	105.4%	$85.28	104.1%

Benchmark equals average of top five systems.

TABLE E-15
RANKING BY LABOR MARKET ADJUSTED LIGHT RAIL OPERATING COST PER VEHICLE HOUR: 1996

Rank	Transit Agency	Cost/ Passenger Mile	Labor Market Factor	Labor Market Adjusted Cost
1	Memphis-MATA	$56.07	0.956	$58.64
2	New Orleans-RTA	$57.42	0.855	$67.13
3	San Diego- The Trolley	$91.94	0.962	$95.58
4	Seattle-Metro	$109.94	1.099	$100.06
5	New Jersey Transit	$131.14	1.158	$113.29
6	Philadelphia-SEPTA	$122.32	1.074	$113.85
7	Denver-RTD	$111.29	0.973	$114.33
8	St. Louis-Bi-State	$125.09	1.063	$117.70
9	San Francisco-Muni	$140.32	1.135	$123.58
10	Sacramento-RT	$138.36	1.017	$136.04
11	**Dallas-DART**	**$143.96**	**0.933**	**$154.37**
12	Baltimore-Maryland-MTA	$155.78	0.988	$157.64
13	Portland-Tri-Met	$171.70	1.064	$161.40
14	Buffalo-NFTA	$181.03	1.116	$162.27
15	San Jose-SCCTD	$206.21	1.135	$181.61
16	Cleveland-RTA	$185.94	1.023	$181.83
17	Boston-MBTA	$205.45	1.075	$191.20
18	Pittsburgh-PAT	$232.80	1.018	$228.79
19	LA-LACMTA-Metro	$317.87	1.054	$301.54

***Calculated from National Transit Database*.**

TABLE E-16
RANKING BY LABOR MARKET ADJUSTED COST PER VEHICLE HOUR: 1996
TRANSIT AGENCIES OPERATING 60 OR MORE PARATRANSIT VEHICLES

Rank	Transit Agency	Cost/ Vehicle Hour	Labor Market Factor	Labor Market Adjusted Cost per Vehicle Hour
1	Milwaukee-Paratransit	$14.55	107.8%	$13.49
2	Louisville-TARC	$17.46	102.4%	$17.06
3	Kansas City-KCATA	$18.45	101.5%	$18.17
4	Norfolk-TRT	$15.46	83.2%	$18.59
5	St. Petersburg-PSTA	$16.30	87.3%	$18.68
6	Orlando-LYNX	$19.89	90.7%	$21.93
7	Salt Lake City-UTA	$21.46	90.1%	$23.82
8	Philadelphia-SEPTA	$25.99	107.4%	$24.19
9	**Houston-Metro**	**$25.10**	**99.5%**	**$25.22**
10	Phoenix PTD	$24.66	92.6%	$26.65

TABLE E-16
RANKING BY LABOR MARKET ADJUSTED COST PER VEHICLE HOUR: 1996
TRANSIT AGENCIES OPERATING 60 OR MORE PARATRANSIT VEHICLES

Rank	Transit Agency	Cost/ Vehicle Hour	Labor Market Factor	Labor Market Adjusted Cost per Vehicle Hour
11	Baltimore-Maryland-MTA	$26.61	98.8%	$26.92
12	Hartford-Metro	$29.41	107.9%	$27.25
13	Pittsburgh-PAT/ACCESS	$27.91	101.8%	$27.43
14	Grand Rapids-GRATA	$26.17	94.1%	$27.80
15	Boston-MBTA	$29.93	107.5%	$27.85
16	Florence-PDRTA	$21.80	77.5%	$28.14
17	Worcester-WRTA	$29.74	105.7%	$28.14
18	LA-OCTA	$29.71	105.4%	$28.19
19	Madison-MMT	$25.43	89.9%	$28.29
20	Allentown-Lanta	$27.64	95.1%	$29.06
21	Springfield-PVTA	$26.75	90.7%	$29.51
22	Miami-MDTA	$26.37	88.9%	$29.67
23	Washington-Ride-On	$33.67	110.5%	$30.47
24	Denver-RTD	$30.06	97.3%	$30.88
25	Chicago-RTA-CTA	$33.18	105.7%	$31.40
26	Tampa-Hartline	$27.57	87.3%	$31.59
27	Hyannis-Cape Cod-CCRTA	$35.00	107.5%	$32.57
28	Fitchburg-MART	$35.19	107.5%	$32.75
29	LA-LACMTA-Metro	$35.05	105.4%	$33.25
30	LA-City of Los Angeles	$35.79	105.4%	$33.95
31	**Dallas-DART**	**$32.12**	**93.3%**	**$34.44**
32	Daytona Beach-VOTRAN	$24.21	69.8%	$34.67
33	Honolulu-DTS	$36.81	105.7%	$34.83
34	San Bernardino-OMNITRANS	$29.20	83.5%	$34.98
35	**San Antonio-VIA**	**$31.91**	**83.7%**	**$38.12**
36	Sacramento-RT	$39.77	101.7%	$39.10
37	Akron-Metro	$40.03	102.3%	$39.15
38	NY-MTA-NYCTA	$50.63	128.1%	$39.52
39	New Jersey Transit	$46.16	115.8%	$39.88
40	Chicago-RTA-Pace	$42.89	105.7%	$40.59
41	Detroit-SMART	$47.69	116.2%	$41.04
42	**Fort Worth-The T**	**$38.34**	**93.3%**	**$41.11**
43	LA-Access	$44.12	105.4%	$41.85
44	Spokane-STA	$34.51	81.1%	$42.55
45	Santa Cruz-METRO	$37.62	86.3%	$43.61
46	Santa Clara - Outreach	$52.12	113.5%	$45.90
47	Portland-Tri-Met	$49.65	106.4%	$46.67
48	**El Paso-Sun Metro**	**$37.39**	**72.2%**	**$51.80**

TABLE E-16
RANKING BY LABOR MARKET ADJUSTED COST PER VEHICLE HOUR: 1996
TRANSIT AGENCIES OPERATING 60 OR MORE PARATRANSIT VEHICLES

Rank	Transit Agency	Cost/ Vehicle Hour	Labor Market Factor	Labor Market Adjusted Cost per Vehicle Hour
49	Tacoma-Pierce Transit	$57.99	109.9%	$52.78
50	**Austin-Capital Metro**	**$54.63**	**94.9%**	**$57.56**
51	Cleveland-RTA	$65.36	102.3%	$63.92
52	Seattle-Metro	$71.91	109.9%	$65.45
53	San Francisco-Muni	$115.94	113.5%	$102.11

Notes at Table E-14.

TABLE E-17
MAINTENANCE PERFORMANCE INDICATORS: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Transit Agency	Miles Road Calls	Rank	Maintenance Cost/Vehicle Hour	Rank	Avg. Bus Age	Rank
Akron-Metro	3,522	58	$0.561	6	8.74	50
Albany-CDTA	5,483	39	$0.741	22	10.49	66
Albuquerque-Sun Tran	9,356	20	$0.525	5	11.69	73
Atlanta-MARTA	3,917	51	$0.990	49	7.87	40
Austin-Capital Metro	**4,578**	**45**	**$0.792**	**27**	**7.92**	**41**
Baltimore-Maryland-MTA	2,741	69	$1.336	66	8.81	51
Boston-MBTA	8,895	21	$1.288	65	5.96	11
Buffalo-NFTA	11,896	14	$1.280	64	6.37	17
Charlotte-CTS	3,105	67	$0.840	37	9.60	61
Chicago-RTA-CTA	3,615	57	$1.485	69	6.64	21
Chicago-RTA-Pace	16,303	6	$0.758	23	5.82	10
Cincinnati-SORTA	13,815	11	$0.921	45	6.22	15
Cleveland-RTA	8,466	22	$1.060	53	8.12	42
Columbus-COTA	11,465	17	$0.799	30	5.45	8
Dallas-DART	**7,086**	**29**	**$0.977**	**47**	**11.41**	**71**
Dayton-RTA	3,360	60	$0.793	29	7.47	32
Denver-RTD	15,630	7	$0.927	46	8.98	55
Detroit-D-DOT	2,422	70	$2.023	75	9.52	60
Detroit-SMART	11,584	16	$0.792	28	2.10	1
El Paso-Sun Metro	**2,773**	**68**	**$0.644**	**18**	**4.59**	**3**
Flint-MTA	8,262	23	$0.479	2	8.35	47
Fort Worth-The T	**7,469**	**28**	**$0.809**	**32**	**6.84**	**26**
Ft. Lauderdale-Bct	6,700	33	$0.835	36	7.85	39
Hartford-CT Transit	3,207	64	$1.001	51	4.38	2

TABLE E-17
MAINTENANCE PERFORMANCE INDICATORS: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Transit Agency	Miles Road Calls	Rank	Maintenance Cost/Vehicle Hour	Rank	Avg. Bus Age	Rank
Honolulu-DTS	7,504	27	$1.155	57	6.76	24
Houston-Metro	**8,055**	**26**	**$1.273**	**63**	**7.58**	**34**
Jacksonville-JTA	9,804	19	$0.601	14	7.55	33
Kansas City-KCATA	6,730	32	$1.076	54	5.14	6
LA-LACMTA-Metro	2,412	71	$1.728	73	9.62	62
LA-Long Beach Transit	5,380	40	$0.842	39	5.19	7
LA-OCTA	10,251	18	$1.084	55	9.29	58
LA-Santa Monica	14,730	10	$0.803	31	8.21	43
Louisville-TARC	1,995	75	$0.775	25	8.98	54
Madison-MMT	3,745	54	$0.874	42	6.72	23
Maryland-Ride-On	23,145	2	$0.896	43	6.19	14
Memphis-MATA	6,354	35	$0.591	10	9.26	56
Miami-MDTA	2,359	73	$0.988	48	7.77	37
Milwaukee-County	3,341	62	$0.897	44	10.49	67
Minneapolis-St. Paul-MCTO	13,667	12	$0.865	41	6.58	20
Nashville-MTA	3,344	61	$0.593	12	8.97	53
New Jersey Transit	4,314	46	$1.095	56	9.28	57
New Orleans-RTA	3,720	55	$1.202	60	10.24	65
Newport News-Pentran	2,381	72	$0.423	1	6.36	16
Norfolk-TRT	13,567	13	$0.568	9	4.98	5
NY-MTA-Long Island Bus	3,814	53	$1.489	70	7.72	35
NY-MTA-NYCTA	3,173	65	$2.363	76	7.20	29
Oakland-AC Transit	3,669	56	$1.343	67	9.86	64
Omaha-TA	6,212	36	$0.622	16	7.16	28
Orlando-LYNX	17,702	5	$0.616	15	4.80	4
Philadelphia-SEPTA	2,307	74	$1.609	72	11.34	70
Phoenix PTD	15,042	8	$1.000	50	11.25	69
Pittsburgh-PAT	4,089	48	$1.161	58	7.05	27
Portland-Tri-Met	4,833	43	$0.829	35	8.29	45
Providence-RIPTA	1,918	76	$0.824	34	7.32	30
Richmond-GRTC	3,941	49	$0.786	26	12.35	75
Rochester-RTS	3,217	63	$1.210	61	7.83	38
Sacramento-RT	6,919	31	$0.841	38	6.48	19
Salt Lake City-UTA	8,224	24	$0.598	13	6.12	13
San Antonio-VIA	**6,994**	**30**	**$0.504**	**3**	**12.91**	**76**
San Diego-NCTD	14,950	9	$0.566	8	8.90	52
San Diego Transit	4,844	42	$0.854	40	7.44	31
San Francisco-Muni	3,171	66	$1.952	74	9.71	63
San Jose-SCCTD	3,939	50	$1.528	71	8.32	46

TABLE E-17
MAINTENANCE PERFORMANCE INDICATORS: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Transit Agency	Miles Road Calls	Rank	Maintenance Cost/Vehicle Hour	Rank	Avg. Bus Age	Rank
Seattle-Metro	3,832	52	$1.190	59	11.49	72
Seattle-Snohomish-Commun.	71,806	1	$0.728	21	8.67	49
SF-SamTrans	8,080	25	$1.049	52	6.02	12
Spokane-STA	11,748	15	$0.765	24	8.37	48
St. Louis-Bi-State	6,441	34	$0.812	33	9.35	59
St. Petersburg-PSTA	19,962	4	$0.562	7	6.67	22
Syracuse-RTA-Centro	6,017	37	$1.211	62	7.75	36
Tacoma-Pierce Transit	22,733	3	$0.636	17	6.78	25
Tampa-Hartline	3,411	59	$0.657	19	10.68	68
Toledo-TARTA	5,718	38	$0.683	20	6.40	18
Tucson-Sun Tran	4,229	47	$0.592	11	8.29	44
Washington-WMATA	4,747	44	$1.428	68	11.91	74
West Palm-CoTran	5,239	41	$0.507	4	5.54	9

Calculated from National Transit Database.

Excludes competitively contracted services, for which this data is not reported.

TABLE E-18
ADMINISTRATIVE PERFORMANCE INDICATORS: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Transit Agency	Administrative Labor Hours per Vehicle Hour	Rank	1,000 Administrative Labor Hours per Boarding	Rank
Akron-Metro	0.170	31	9.65	61
Albany-CDTA	0.147	19	7.12	40
Albuquerque-Sun Tran	0.236	58	10.31	63
Atlanta-MARTA	0.385	78	11.88	71
Austin-Capital Metro	**0.206**	**47**	**6.75**	**36**
Baltimore-Maryland-MTA	0.246	62	6.14	31
Boston-MBTA	0.128	15	3.23	9
Buffalo-NFTA	0.112	8	4.72	18
Charlotte-CTS	0.109	7	3.69	12
Chicago-RTA-CTA	0.129	16	2.90	6
Chicago-RTA-Pace	0.189	40	8.00	49
Cincinnati-SORTA	0.152	21	5.24	24
Cleveland-RTA	0.350	77	13.01	74
Columbus-COTA	0.229	56	9.10	57
Dallas-DART	**0.442**	**79**	**16.71**	**79**
Dayton-RTA	0.225	55	9.62	60

TABLE E-18
ADMINISTRATIVE PERFORMANCE INDICATORS: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Transit Agency	Administrative Labor Hours per Vehicle Hour	Rank	1,000 Administrative Labor Hours per Boarding	Rank
Denver-RTD	0.199	44	7.02	37
Detroit-D-DOT	0.182	36	5.64	27
Detroit-SMART	0.175	33	12.06	72
El Paso-Sun Metro	**0.128**	**13**	**4.29**	**14**
Flint-MTA	0.183	38	7.08	38
Fort Worth-The T	**0.262**	**67**	**16.16**	**78**
Ft. Lauderdale-Bct	0.248	64	7.69	47
Hartford-CT Transit	0.183	37	5.95	30
Honolulu-DTS	0.126	12	2.31	2
Houston-Metro	**0.349**	**76**	**12.43**	**73**
Indianapolis-Metro	0.117	10	4.30	15
Jacksonville-JTA	0.134	18	7.58	43
Kansas City-KCATA	0.231	57	9.17	58
LA-LACMTA-Metro	0.244	61	4.95	21
LA-Long Beach Transit	0.196	43	5.06	22
LA-OCTA	0.462	80	13.77	76
LA-Santa Monica	0.089	2	1.47	1
Louisville-TARC	0.156	23	5.33	26
Madison-MMT	0.133	17	4.86	20
Maryland-Ride-On	0.099	4	3.60	10
Memphis-MATA	0.182	35	7.39	42
Miami-MDTA	0.160	24	5.15	23
Milwaukee-County	0.128	14	3.20	8
Minneapolis-St. Paul-MCTO	0.166	27	5.67	28
Nashville-MTA	0.075	1	2.81	5
New Jersey Transit	0.212	49	8.08	50
New Orleans-RTA	0.219	51	4.33	16
Newport News-Pentran	0.278	73	11.15	66
Norfolk-TRT	0.270	70	13.60	75
NY-MTA-Long Island Bus	0.183	39	5.95	29
NY-MTA-NYCTA	0.167	29	3.20	7
NY-Westchester-Liberty	0.108	6	2.77	4
Oakland-AC Transit	0.224	54	6.69	35
Omaha-TA	0.166	28	9.62	59
Orlando-LYNX	0.167	30	7.67	46
Philadelphia-SEPTA	0.259	65	6.33	34
Phoenix PTD	0.261	66	7.60	45
Pittsburgh-PAT	0.220	52	7.59	44

TABLE E-18
ADMINISTRATIVE PERFORMANCE INDICATORS: 1996
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES

Transit Agency	Administrative Labor Hours per Vehicle Hour	Rank	1,000 Administrative Labor Hours per Boarding	Rank
Portland-Tri-Met	0.206	46	6.21	32
Providence-RIPTA	0.120	11	4.49	17
Richmond-GRTC	0.155	22	4.07	13
Rochester-RTS	0.166	26	6.29	33
Sacramento-RT	0.266	69	8.28	51
Salt Lake City-UTA	0.246	63	11.24	67
San Antonio-VIA	**0.216**	**50**	**7.96**	**48**
San Bernardino-OMNITRANS	0.181	34	8.31	52
San Diego-NCTD	0.150	20	7.13	41
San Diego Transit	0.174	32	4.79	19
San Francisco-Muni	0.162	25	2.56	3
San Jose-SCCTD	0.338	75	10.95	64
Seattle-Metro	0.237	59	8.91	53
Seattle-Snohomish-Commun.	0.276	72	19.76	80
SF-Golden Gate	0.223	53	11.83	70
SF-SamTrans	0.237	60	9.08	55
Spokane-STA	0.193	42	9.89	62
St. Louis-Bi-State	0.206	48	9.05	54
St. Petersburg-PSTA	0.204	45	11.65	68
Syracuse-RTA-Centro	0.274	71	9.09	56
Tacoma-Pierce Transit	0.264	68	11.72	69
Tampa-Hartline	0.294	74	16.06	77
Toledo-TARTA	0.105	5	7.10	39
Tucson-Sun Tran	0.114	9	3.64	11
Washington-WMATA	0.192	41	5.31	25
West Palm-CoTran	0.096	3	11.11	65

Calculated from National Transit Database.

TABLE E-19
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES
RANKED BY FARES AS A PERCENTAGE OF
BUS AND RAIL OPERATING COSTS: 1996

Rank	Transit Agency	Fare Ratio
1	NY-MTA-NYCTA	73.4%
2	San Diego-MTDB	51.8%
3	LA-Santa Monica	51.1%
4	New Jersey Transit	50.5%
5	Washington-WMATA	50.1%
6	Chicago-RTA-CTA	47.0%

TABLE E-19
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES
RANKED BY FARES AS A PERCENTAGE OF
BUS AND RAIL OPERATING COSTS: 1996

Rank	Transit Agency	Fare Ratio
7	LA-Foothill Transit	46.7%
8	Richmond-GRTC	46.1%
9	NY-MTA-Long Island Bus	44.8%
10	Atlanta-MARTA	41.7%
11	Philadelphia-SEPTA	41.2%
12	Nashville-MTA	40.6%
13	Boston-MBTA	40.4%
14	New Orleans-RTA	40.2%
15	Milwaukee-County	40.0%
16	Orlando-LYNX	39.6%
17	Miami-MDTA	39.6%
18	Newport News-Pentran	39.2%
19	Rochester-RTS	38.9%
20	Minneapolis-St. Paul-MCTO	38.6%
21	Norfolk-TRT	38.1%
22	Hartford-CT Transit	37.9%
23	Flint-MTA	37.7%
24	Memphis-MATA	36.9%
25	Albany-CDTA	35.8%
26	San Francisco-Muni	35.7%
27	Phoenix PTD	35.6%
28	Baltimore-Maryland-MTA	35.6%
29	Syracuse-RTA-Centro	34.9%
30	LA-Long Beach Transit	34.0%
31	San Diego-NCTD	33.5%
32	Buffalo-NFTA	33.3%
33	Cincinnati-SORTA	31.9%
34	SF-Golden Gate	31.5%
35	Chicago-RTA-Pace	30.6%
36	LA-LACMTA-Metro	30.2%
37	Omaha-TA	29.9%
38	Indianapolis-Metro	29.7%
39	Honolulu-DTS	29.3%
40	Sacramento-RT	28.2%
41	Charlotte-CTS	28.0%
42	Pittsburgh-PAT	28.0%
43	Toledo-TARTA	27.8%
44	**El Paso-Sun Metro**	**27.6%**
45	NY-Hauppage-Suffolk Trans	27.0%
46	Madison-MMT	27.0%

TABLE E-19
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES
RANKED BY FARES AS A PERCENTAGE OF
BUS AND RAIL OPERATING COSTS: 1996

Rank	Transit Agency	Fare Ratio
47	Columbus-COTA	26.9%
48	Portland-Tri-Met	26.9%
49	Ft. Lauderdale-Bct	26.3%
50	Oakland-AC Transit	25.8%
51	LA-OCTA	25.8%
52	SF-SamTrans	25.6%
53	Providence-RIPTA	25.3%
54	Seattle-Metro	24.8%
55	Cleveland-RTA	24.5%
56	St. Louis-Bi-State	23.7%
57	St. Petersburg-PSTA	23.5%
58	**Houston-Metro**	**23.0%**
59	**San Antonio-VIA**	**22.9%**
60	Detroit-D-DOT	22.0%
61	San Bernardino-OMNITRANS	21.7%
62	Denver-RTD	21.6%
63	Maryland-Ride-On	21.5%
64	Springfield-PVTA	21.4%
65	Tucson-Sun Tran	21.3%
66	Jacksonville-JTA	20.8%
67	Kansas City-KCATA	20.6%
68	Louisville-TARC	20.6%
69	Salt Lake City-UTA	20.2%
70	Detroit-SMART	20.1%
71	**Fort Worth-The T**	**19.4%**
72	Seattle-Snohomish-Commun.	19.3%
73	Tacoma-Pierce Transit	18.5%
74	City of Los Angeles	18.5%
75	Tampa-Hartline	17.5%
76	Dayton-RTA	17.3%
77	Akron-Metro	17.2%
78	Spokane-STA	15.0%
79	Albuquerque-Sun Tran	14.9%
80	San Jose-SCCTD	14.6%
81	**Dallas-DART**	**12.5%**
82	West Palm-CoTran	11.3%
83	**Austin-Capital Metro**	**11.1%**
Average		30.1%

Calculated from National Transit Database.
Excludes capital expenditures.

TABLE E-20
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES
RANKED BY SUBSIDIES AS A PERCENTAGE OF
BUS AND RAIL OPERATING COSTS: 1996

Rank	Transit Agency	Subsidy Ratio
1	NY-MTA-NYCTA	25.4%
2	LA-Santa Monica	41.5%
3	SF-SamTrans	42.3%
4	New Jersey Transit	43.2%
5	San Diego-MTDB	46.4%
6	Atlanta-MARTA	47.7%
7	Washington-WMATA	47.9%
8	Chicago-RTA-CTA	51.6%
9	Richmond-GRTC	52.4%
10	LA-Foothill Transit	52.8%
11	NY-MTA-Long Island Bus	54.9%
12	Philadelphia-SEPTA	56.3%
13	New Orleans-RTA	56.8%
14	Boston-MBTA	57.6%
15	Nashville-MTA	58.3%
16	Orlando-LYNX	59.3%
17	Newport News-Pentran	59.5%
18	Milwaukee-County	59.9%
19	Minneapolis-St. Paul-MCTO	60.0%
20	Miami-MDTA	60.0%
21	Flint-MTA	60.2%
22	Norfolk-TRT	60.5%
23	Rochester-RTS	60.7%
24	Memphis-MATA	61.0%
25	Albany-CDTA	61.8%
26	Hartford-CT Transit	62.0%
27	San Diego-NCTD	62.1%
28	San Francisco-Muni	62.2%
29	Baltimore-Maryland-MTA	63.7%
30	Syracuse-RTA-Centro	63.7%
31	LA-Long Beach Transit	63.8%
32	Phoenix PTD	63.9%
33	Omaha-TA	64.5%
34	Buffalo-NFTA	65.3%
35	Cincinnati-SORTA	65.7%
36	**Houston-Metro**	**66.8%**
37	SF-Golden Gate	67.7%
38	Chicago-RTA-Pace	68.1%
39	LA-LACMTA-Metro	68.1%
40	Springfield-PVTA	68.1%

TABLE E-20
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES
RANKED BY SUBSIDIES AS A PERCENTAGE OF
BUS AND RAIL OPERATING COSTS: 1996

Rank	Transit Agency	Subsidy Ratio
41	Charlotte-CTS	68.6%
42	**El Paso-Sun Metro**	**69.4%**
43	Columbus-COTA	69.5%
44	Indianapolis-Metro	69.8%
45	Pittsburgh-PAT	69.9%
46	Honolulu-DTS	69.9%
47	**San Antonio-VIA**	**70.0%**
48	Sacramento-RT	70.2%
49	**Fort Worth-The T**	**70.4%**
50	Portland-Tri-Met	70.6%
51	Oakland-AC Transit	71.5%
52	Maryland-Ride-On	71.6%
53	Toledo-TARTA	71.7%
54	LA-OCTA	72.3%
55	Seattle-Metro	72.4%
56	NY-Hauppage-Suffolk Trans	73.0%
57	Madison-MMT	73.0%
58	Ft. Lauderdale-Bct	73.2%
59	Denver-RTD	73.5%
60	Dayton-RTA	73.5%
61	Providence-RIPTA	73.7%
62	Cleveland-RTA	74.2%
63	St. Louis-Bi-State	74.2%
64	Salt Lake City-UTA	75.1%
65	St. Petersburg-PSTA	75.9%
66	San Bernardino-OMNITRANS	76.1%
67	Jacksonville-JTA	76.4%
68	Seattle-Snohomish-Commun.	76.9%
69	Kansas City-KCATA	77.1%
70	Louisville-TARC	77.7%
71	Detroit-D-DOT	77.8%
72	Tacoma-Pierce Transit	78.0%
73	Tucson-Sun Tran	78.1%
74	San Jose-SCCTD	78.9%
75	Detroit-SMART	79.7%
76	Tampa-Hartline	79.8%
77	City of Los Angeles	81.5%
78	Akron-Metro	82.1%
79	Spokane-STA	83.2%
80	Albuquerque-Sun Tran	83.8%

TABLE E-20
TRANSIT AGENCIES OPERATING 100 OR MORE BUSES RANKED BY SUBSIDIES AS A PERCENTAGE OF BUS AND RAIL OPERATING COSTS: 1996

Rank	Transit Agency	Subsidy Ratio
81	**Dallas-DART**	**87.0%**
82	West Palm-CoTran	88.3%
83	**Austin-Capital Metro**	**89.5%**
Average		67.0%

Calculated from National Transit Database.
Excludes Capital Subsidies.

TABLE E-21
BOARDINGS PER DOWNTOWN ORIENTED CORRIDOR: NEW RAIL SYSTEMS

Rank	Location	Type	Daily Ridership	Downtown Oriented Corridors	Ridership per Corridor
1	Washington	Heavy Rail	732,300	9	81,367
2	Baltimore	Heavy Rail	46,400	1	46,400
3	Atlanta	Heavy Rail	248,700	6	41,450
4	Los Angeles	Heavy Rail	34,400	1	34,400
5	Portland	Light Rail	33,000	1	33,000
6	San Diego	Light Rail	77,300	3	25,767
7	Los Angeles	Light Rail	70700	3	23,567
8	Miami	Heavy Rail	44,800	2	22,400
9	St. Louis	Light Rail	43,600	2	21,800
10	Buffalo	Light Rail	20,400	1	20,400
11	Sacramento	Light Rail	28,400	2	14,200
12	**Dallas**	**Light Rail**	**38,300**	**3**	**12,767**
13	Baltimore	Light Rail	31,200	3	10,400
14	Denver	Light Rail	15,700	2	7,850
15	San Jose	Light Rail	22,300	3	7,433
16	Los Angeles	Commuter Rail	26,300	6	4,383
17	San Diego	Commuter Rail	3,900	1	3,900
18	Washington	Commuter Rail	6,200	2	3,100
19	Miami	Commuter Rail	8,300	3	2,767
20	**Dallas**	**Commuter Rail**	**1,900**	**1**	**1,900**

Calculated from American Public Transit Association data (1998, 2nd quarter).

TABLE E-22
ONE-WAY FIXED GUIDEWAY MILEAGE BY METROPOLITAN AREA: 1996

Rank	Metropolitan Area	Mileage	Primary Modes
1	New York	569	Heavy Rail, Light Rail
2	San Francisco	241	Heavy Rail, Light Rail
3	Chicago	210	Heavy Rail

TABLE E-22
ONE-WAY FIXED GUIDEWAY MILEAGE BY METROPOLITAN AREA: 1996

Rank	Metropolitan Area	Mileage	Primary Modes
4	Philadelphia	180	Heavy Rail, Light Rail
5	Washington	178	Heavy Rail
6	Seattle	161	Busway-HOV
7	Boston	134	Heavy Rail, Light Rail
8	Houston	132	Busway-HOV
9	Los Angeles	111	Heavy Rail, Light Rail
10	Atlanta	92	Heavy Rail
11	Pittsburgh	80	Light Rail/Busway-HOV
12	Baltimore	73	Heavy Rail, Light Rail
13	Cleveland	69	Heavy Rail, Light Rail
14	San Diego	61	Light Rail
15	Phoenix	59	Busway-HOV
16	**Dallas**	**47**	**Light Rail**
17	Minneapolis-St.Paul	42	Busway-HOV
18	Miami	42	Heavy Rail
19	St. Louis	40	Light Rail
20	Sacramento	36	Light Rail
21	Portland	32	Light Rail
22	Denver	28	Light Rail
23	Hartford	27	Busway-HOV
24	New Orleans	18	Light Rail
25	Buffalo	12	Light Rail

Calculated from National Transit Database.

TABLE E-23
FIXED GUIDEWAY OPERATING SPEED BY METROPOLITAN AREA: 1996

Rank	Metropolitan Area	Miles per Hour	Primary Modes
1	Atlanta	27.3	Heavy Rail
2	**Houston**	**26.0**	**Busway-HOV**
3	Washington	25.7	Heavy Rail
4	Miami	25.3	Heavy Rail
5	St. Louis	25.1	Light Rail
6	San Francisco	24.3	Heavy Rail, Light Rail
7	Chicago	23.2	Heavy Rail
8	Baltimore	21.6	Heavy Rail, Light Rail
9	Boston	20.2	Heavy Rail, Light Rail
10	Los Angeles	20.2	Heavy Rail, Light Rail
11	Cleveland	19.2	Heavy Rail, Light Rail
12	San Diego	18.6	Light Rail
13	Sacramento	18.2	Light Rail

TABLE E-23
FIXED GUIDEWAY OPERATING SPEED BY METROPOLITAN AREA: 1996

Rank	Metropolitan Area	Miles per Hour	Primary Modes
14	Philadelphia	17.5	Heavy Rail, Light Rail
15	New York	17.2	Heavy Rail, Light Rail
16	Denver	14.6	Light Rail
17	Portland	14.4	Light Rail
18	**Dallas (1997)**	**14.1**	**Light Rail**
19	Buffalo	11.8	Light Rail
20	New Orleans	9.0	Light Rail
	Pittsburgh	NA	Light Rail/Busway-HOV
	Phoenix	NA	Busway-HOV
	Seattle	NA	Busway-HOV
	Hartford	NA	Busway-HOV
	Minneapolis-St.Paul	NA	Busway-HOV

Calculated from National Transit Database.

Note: Busway operating speeds are generally unavailable through the National Transit Database.

TABLE E-24
COMPARISON OF BUS AND LIGHT RAIL OPERATING COSTS: STATUS QUO AND COST MINIMIZATION POLICIES

Year	Status Quo	Cost Minimization	Savings
1999	$191.1	$191.1	$0.0
2000	$197.8	$183.2	$14.6
2001	$204.8	$175.5	$29.3
2002	$225.4	$180.7	$44.7
2003	$236.4	$179.0	$57.4
2004	$238.7	$170.3	$68.3
2005	$241.0	$162.1	$78.9
2006	$243.3	$154.2	$89.1
2007	$245.6	$146.7	$98.9
2008	$248.0	$139.6	$108.4
2009	$250.4	$132.8	$117.6
Total	$2,331.4	$1,624.1	$707.3