URBAN RAIL TRANSIT

Local governments are currently investigating the viability of rail transit (primarily light rail and commuter rail) in Wisconsin's two largest urban areas, including the availability of financing and whether rail would be more efficient and cost effective than other approaches to congestion, pollution and land use.

This bulletin summarizes current concerns about improving public transportation and compares the distinguishing characteristics of the different modes of urban rail transit. It provides an overview of the history of rail transit in the state and outlines the evolution of current rail proposals for southeastern and southern Wisconsin. It also surveys the experiences of comparable urban areas outside the state.

I. BACKGROUND

Through the first half of the 20th century, streetcars and interurban trains were a common form of urban transportation in a great number of cities in the United States, including several in Wisconsin. By the 1950s and early 1960s, however, streetcar lines were replaced with bus service in most cities. With few exceptions, the only modes of urban rail transit that remained were the commuter rail and subway or elevated trains that served the largest metropolitan areas. The most familiar example in the Midwest is the Chicago transit model, which includes commuter railways operating between the city and the suburbs and frequent service within the city provided both by elevated and underground heavy rail transit and diesel buses. Not until the 1980s did medium-sized metropolitan areas begin to return to the idea of rail for urban mass transit. Since the 1980s an increasing number of U.S. cities have built or are planning new rail systems using a variety of technologies. Some are considered successful, but others have encountered difficulties.

The debate about urban rail transit recognizes a number of concerns:

Pollution and congestion. Despite improvements in automotive technology, air pollution from increasing vehicular traffic remains a major urban concern. Vehicle emissions are a problem for Wisconsin counties along Lake Michigan that risk being designated "nonattainment" areas under federal air quality standards. Failure to meet these standards may force counties to implement expensive, unpopular and inconvenient control measures. "Ozone alerts" during the summer are another indication of the scale of the problem. As traffic volume continues to grow, noise pollution also becomes a concern to residents living near freeways or busy streets.

Increased traffic volume also means increased congestion. "Gridlock" and "road rage" have become a part of the daily commuter's vocabulary, and traveling even relatively short distances can be time-consuming, with an impact on the economy and on the quality of life. Heavier traffic strains state and local road maintenance budgets as roads deteriorate faster under greater use.

Congestion leads to demands for highway expansion in an attempt to get people to and from work, school, shopping, recreation and other activities. On the other hand, pressures for highway improvement raise questions about land use priorities and whether added roads and parking facilities simply increase demands.

Public transportation currently accounts for a relatively small proportion of total trips and probably will continue to do so for the foreseeable future. Although it cannot eliminate con-

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gestion, transit advocates assert it can relieve the need to expand peak roadway capacity and parking facilities. Critics respond that it is unlikely urban rail service will ever meet its potential as a substitute for additional highway lanes. They argue light rail systems do not draw enough new riders away from driving their automobiles and will do little more than make a dent in the rapid growth of new automobile traffic.

In addition to highway and rail construction, there are other approaches which potentially can reduce pollution and congestion. "Transportation demand management" (TDM) tools include: encouraging employers to offer flex-time or compressed schedules to ease peak hour congestion, providing subsidies for employees' transit passes to make public transit a more attractive option, and improving the safety and convenience of bicycling and walking.

Employment growth. In many metropolitan areas the balance between population and employment growth has shifted. Suburban businesses have trouble finding employees, while central city residents who need work lack private or public transportation to get to the suburban jobs. That imbalance has led some observers to call for greater intergovernmental cooperation in developing and financing public transportation, but others are concerned with maintaining local control over taxation and expenditures.

Mobility of aging citizens. An aging population means more people who are no longer comfortable driving automobiles or are physically unable to do so safely. Convenient, affordable and accessible public transportation may become increasingly important to older citizens who wish to remain independent.

Personal choice. Some people, even though they may have private automobiles and are still able to drive, would simply prefer to drive less often and might use public transportation for some trips if it were economical and convenient enough to meet their work and personal schedules. Others prefer the convenience of private vehicles. Both advocates and critics agree that people are unlikely to use public transit if it is inconvenient, does not operate frequently and quickly and does not serve key destinations. They disagree about whether rail transit can ever be convenient enough to convince people to use their cars less often.

Land use and quality of life. Transportation is an essential component of land use planning. Decisions about extending highways can leave people dependent on private vehicles, hasten "urban sprawl" and alter the quality of life in both urban and suburban areas. Better coordination of transportation systems may reduce daily dependence on the automobile and promote transit-oriented commercial and residential development. Rail transit advocates argue that the relative permanence of urban rail tracks and stations, compared to bus stops, can assure potential investors and residents that rapid transit will continue to serve a particular location. Those who advocate bus-only systems contend buses have more flexibility to adapt to changing land uses because bus routes can be eliminated or added as deemed appropriate.

Cost. Building and maintaining any component of a transportation system – streets, highways, bus systems, rail systems and other transportation infrastructure investments – typically costs millions of dollars per mile and may permanently displace people from their homes and businesses. A discussion of any investment in transportation facilities should entail consideration of both direct and indirect costs incurred or avoided.

Chicago-area urban rail transit includes commuter rail and heavy rail. Metra rail (left) provides conventional "push-pull" locomotive commuter rail service from Chicago to northern Illinois, northern Indiana and Kenosha. Chicago Transit Authority operates heavy rail rapid transit on elevated and underground tracks running within Chicago and to adjoining cities. High platform stations (right) allow entry at train-floor level. (See photo credits in bibliography.)

II. URBAN RAIL: TECHNOLOGY AND SERVICE OPTIONS

Urban rail transit can be classified into three broad categories – commuter rail, heavy rail and light rail – based on the technologies employed and the nature of the service provided. In addition, there are some newer technologies that combine different features of the three "pure" types. (Dane County is studying one of those "hybrid" forms for a possible rail service.) Appendix A provides a more comprehensive explanation of the three types of rail service, as well as some variations on the basic types.

Commuter rail or "regional rail" resembles intercity railroad service with passenger cars pulled by a locomotive on standard railway tracks. It is oriented toward peak-hour service, connecting widely spaced stations in distant suburban or rural areas with the core of the metropolitan area. Commuter rail service within a city is usually limited, and it is infrequent during off-peak periods, if it is provided at all.

Heavy rail, also called "rapid rail", "subway" or "metro", uses an electrified third rail to power cars that provide all-day service at frequent intervals. The trains operate within the city, typically with stations placed a mile or less apart. Heavy rail is the most expensive kind of service to build and is limited to larger cities with high passenger volumes that can support the high initial cost of underground tunnels or elevated tracks and electrification.

Light rail transit (LRT) also provides frequent, all-day service, but electricity is supplied by overhead wires, rather than an electrified third rail. Unlike heavy rail, light rail trains run either along city streets or on grade-separated rights-of-way. Light rail costs less to build than heavy rail and is designed for lower passenger volumes, both of which have made it a workable choice for a number of medium-sized cities.

Light rail does not require a fully separated right-of-way because power is supplied by overhead catenary, rather than an electrified rail. It can operate on rights-of-way, which are fully or partially separated or at street level alongside traffic, as shown in these photographs from Baltimore (left) and Pittsburgh (right).

III. PROPOSALS FOR URBAN RAIL IN WISCONSIN

Except for Illinois' Metra commuter rail service between Chicago and Kenosha, no Wisconsin city currently includes rail service as a component of its public mass transit system. Urban rail transit is being considered, however, in the Milwaukee and Madison metropolitan areas.

Milwaukee and Southeastern Wisconsin

The *Milwaukee Journal-Sentinel* (March 24, 1997) surveyed the 30 largest U.S. cities and noted that Milwaukee, the 19th largest U.S. city with a population of about 600,000, is one of the largest cities without any form of rail transit or high-occupancy vehicle (HOV) highway lanes, whereas a number of other metro areas the size of Milwaukee or smaller have light rail or have begun construction of light rail or commuter rail systems.

History. The history of urban rail in Milwaukee dates back to 1890, when the Milwaukee Electric Rail and Light Company began streetcar operations. Streetcars, as well as a number of interurban rail lines, carried people into and around Milwaukee until the late 1950s and early 1960s. By then, Los Angeles-style freeways were considered the future of urban transportation, and the popularity of streetcars declined on all but a few routes. Transit advocates agreed streetcars were noisy and, because they ran down the middle of city streets, potentially hazardous to riders who had to cross automobile traffic lanes, but they thought better urban transit design could overcome these problems.

In 1958, Milwaukee's streetcars were replaced by "trackless trolleys", which operated on rubber tires, rather than tracks, and were powered by overhead lines. These vehicles, which could pull to the curb to discharge passengers, were safer and quieter, but they remained in service only until 1965, when diesel buses were put on all routes. (Trackless trolleys, or "trolleybuses" as they are now called, are quieter and more efficient than diesel buses, but they currently serve relatively few U.S. cities – Boston, Dayton, Philadelphia, San Francisco and Seattle.)

Early rail studies. Beginning in 1979, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) included light rail transit (LRT) in a major study of the land use and

transportation conditions in its 7-county region of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington and Waukesha Counties. SEWRPC issued a report on transit system planning in 1982, in which it reviewed a number of possible alternative modes (including heavy rail, bus-on-freeway, busway, commuter rail and light rail) and corridors for each.

In its study, the commission eliminated heavy rail from further consideration because of high capital costs. It also found light rail superior to the bus options because LRT had greater potential to influence development and appeared more advantageous in terms of reliability, safety, environmental quality and ability to carry passengers. The commission recommended a light rail system that would initially serve downtown Milwaukee; the University of Wisconsin-Milwaukee; Timmerman Field; and the Northridge, Southridge and Mayfair shopping centers. The service could later be expanded to replace existing freeway bus routes in some corridors. The study also recommended diesel commuter service linking Milwaukee with the cities of Racine and Kenosha.

Metro 2020. In 1989, Governor Tommy G. Thompson appointed the Metro 2020 Policy Board to develop a comprehensive transportation strategy for Southeastern Wisconsin. The most extensive option developed for the board by a private consulting firm, BRW, Inc., was a 62.3-mile system with service extending to Port Washington or Saukville, Waukesha and Oak Creek. BRW's recommendation was to start with a $455-million, 19-mile system that would extend 3.4 miles from downtown to UW-Milwaukee (UW-M Line), 8.2 miles west to the Milwaukee County Zoo (West Line) and 7.4 miles south to Mitchell International Airport (South Line), serving an estimated 60,000 riders per day. By extending the West Line into Waukesha County, the system could serve an additional 24,000 riders. The report also recommended a commuter rail line for Kenosha, Racine and Milwaukee.

The Metro 2020 final report (1991) proposed a number of programs to promote employment and economic development and reduce congestion by offering attractive alternatives to driving. It recommended the creation of a regional transportation authority for the 7-county region and included proposals for land use, highways and the mass transit system. The largest part of the suggested $1.8-billion package was $984.6 million targeted for highway financing. Metro 2020's proposal for LRT, at $332 million, was somewhat smaller than the one recommended by BRW. (Metro 2020 recommended dropping the South Line and leaving it for future study.) Much of the remaining portion of the $1.8 billion was devoted to preserving the existing transit system and Amtrak service and adding more express bus service.

A study, which the City of Milwaukee commissioned during the same time period (1989-91), recommended a $417-million system with lines from downtown west to the County Grounds, northeast to University of Wisconsin-Milwaukee and northwest to Mill Road. Nongovernmental groups, such as the New Transportation Alliance and other supporters of LRT, have since proposed more extensive routes.

Support for LRT. Milwaukee County Executive F. Thomas Ament and Milwaukee Mayor John Norquist have both supported adding LRT to the county's transit system. Local business support for LRT includes the Alliance for Future Transit, a coalition of Milwaukee area businesses concerned about disruption during the reconstruction of Interstate 94. They support having a $277.1 million, 14-mile "starter system" in place before major freeway work begins, with the possibility of the system being extended north to UW-M prior to work on Interstate 43. Their plan would use the hybrid RegioSprinter train on existing tracks for most of the route.

Opposition to LRT. Waukesha County Executive Daniel Finley opposed LRT and vetoed a 1997 Waukesha County Board resolution to study a proposal for a regional transportation authority and a $1.76-billion transportation plan that included a $1.32-billion reconstruction of I-94 with bus lanes from Waukesha County into downtown Milwaukee and a $330-million LRT proposal for Milwaukee County. Finley supported bus lanes from Waukesha County into Milwaukee but opposed LRT in Milwaukee. Private sector opponents such as A.L.E.R.T. (Against Light Electric Rail Transit), view LRT as the return of the streetcar. They argue it would increase taxes and most drivers would not use it. A study for the Wisconsin Policy Research Institute, Inc., questioned the accuracy of the LRT cost estimates and recommended that additional general purpose highway lanes, along with busways and HOV lanes (i.e., car-pooling) would be a more effective way to increase the capacity of the road system as opposed to building an urban rail system.

1997-98 legislative activity. Amendments to 1997 Assembly Bill 100, the biennial budget bill, would have prohibited or restricted funding HOV lanes and LRT, but they were deleted before final passage. At the urging of some suburban legislative leaders, Governor Thompson agreed that no state or federal funds (including the remaining $241 million of $289 million in federal funding originally designated for Milwaukee transit enhancements) would be spent during the biennium to study light rail in Milwaukee. According to media reports, Wisconsin Department of Transportation Secretary Charles Thompson made the same pledge in a letter but later stated that LRT and HOV remain part of the East-West Corridor project proposal in order to preserve Wisconsin's $241-million in federal funding.

Assembly Speaker Scott Jensen, along with three Republican representatives, introduced 1997 Assembly Bill 902 to prohibit urban mass transit aid payments by the state for new rail service, with the exception of Amtrak, but the Committee on Highways and Transportation did not act on the bill. He also discussed, but did not introduce, a possible referendum in Milwaukee, Waukesha, Ozaukee, Washington and Racine Counties regarding LRT in Milwaukee County. (At the local level, the Milwaukee County Board voted in April 1997 to submit the entire transportation plan – including LRT, HOV lanes and expanded bus service – to Milwaukee County voters once information on costs, funding and rider projections was available.)

Commuter rail. To help alleviate congestion during part of the reconstruction of Interstate 94 in summer 1998, the Chicago-Milwaukee Amtrak service was temporarily extended to Watertown for a limited number of daily trips that were scheduled to serve eastbound commutes into Milwaukee. Scheduling did not accommodate those wanting to commute from Milwaukee to the western suburbs. Whether the 1998 trial run will promote further east-west service is unknown.

Other proposals include extending existing Chicago Metra rail service from Kenosha to Milwaukee. The extension would cost an estimated $152.4 million for track upgrades, equipment and other capital costs, plus $7.8 million in annual operating expenses, according to a SEWRPC feasibility study. The federal government could fund up to 80% of the capital cost and fares would cover about 48% of the operating expenses (more than the 18%-40% farebox recovery rates of bus systems in southeastern Wisconsin). Metra fares from Milwaukee to Chicago would be cheaper than the current Amtrak service, but it is expected that most of the new riders would use the service between the Wisconsin cities that are not served by Amtrak. Extension of three other Metra lines from Illinois into Wisconsin is also being considered (Fox Lake to Walworth, Harvard to Janesville, and Antioch to Burlington).

Other proposals for commuter rail include a Wisconsin & Southern Railroad proposal to provide service from Milwaukee to Hartford, if Milwaukee and Washington County governments will finance $25 to $50 million in track upgrades. A West Bend Common Council resolution called for the SEWRPC to study service from Milwaukee to West Bend and other Washington County communities.

Madison and Dane County

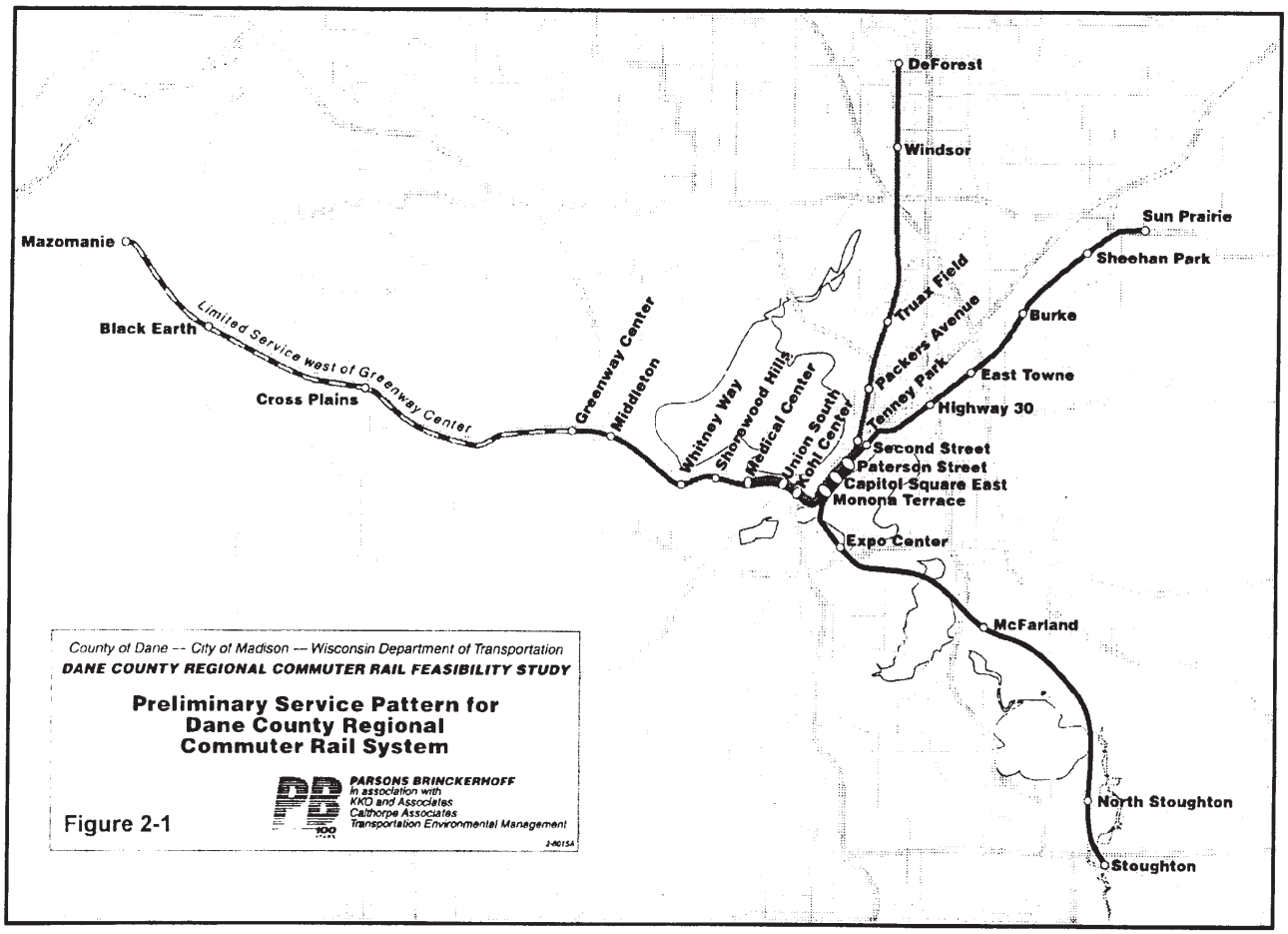
With a federally estimated population of 197,630 (1996), Madison is the 81st largest U.S. city and is smaller than most U.S. cities that currently provide commuter rail or LRT service. The Madison Metropolitan Statistical Area (MSA), which is coterminous with Dane County, has 395,366 residents, making it the 98th largest MSA in the United States. Although Madison currently uses only buses in its mass transit system, ridership is comparable to cities of greater size.

Urban rail advocates argue that population density and travel patterns in Madison's 3/4-mile-wide isthmus make light rail or commuter rail economically attractive and feasible, and, in the 1990s, both Madison and Dane County have conducted extensive demographic and transportation studies. In combination, the studies, which are described in more detail below, concluded that the Madison-Dane County situation calls for a commuter rail solution, rather than the more typical use of light rail transit. The commuter rail system Dane County is considering, however, would use newer, "hybrid" diesel rail technology that can use existing tracks and adopt some of the characteristics of commuter rail in the less densely populated suburban areas (see Appendix A) and of light rail for the densely populated isthmus.

1992 Madison light rail study. A 1992 study, conducted for Madison Metro by Cambridge Systematics, estimated that capital costs for a 13.2-mile light rail system running from the East Towne shopping center, through the isthmus and University of Wisconsin campus to the Hilldale and West Towne shopping areas, could range from $183 million to $306 million. The city decided that the transit corridor could not support the initial costs of new tracks, guideways, electrification, maintenance facilities and stations at that time.

1996 Dane County commuter rail study. A 1996 study by the Dane County Committee to Evaluate Commuter Rail Implementation reported that Dane County had several historical, geographic and demographic characteristics that made it a candidate for an urban rail system. The report referred to both a "spider web" of railway lines that have been actively preserved, and the communities that are still located on those rail corridors. It noted the government, education, cultural and recreational attractions located on Madison's narrow isthmus, as well as the hospitals, financial institutions and professional services concentrated along existing rail corridors. Opportunities for roadway expansion through the isthmus are limited and major arteries feeding into the isthmus are near full capacity.

The combination of concentrated destinations and the impact of routing more automobile traffic through the isthmus has already contributed to bus system ridership comparable to that of cities with populations in the 750,000-1,000,000 range, such as Hartford, Connecticut; Indianapolis, Indiana; and Richmond, Virginia. The report also compared the Dane County and Madison population densities to those of metropolitan areas that have or are building commuter rail service and found them comparable to Vancouver, British Columbia, and Dallas, Texas (see description in Appendix B). The report concluded: "The community and the region appear tailor made for rail transit." It further recommended the creation of a regional transit



Dane County is considering a hybrid commuter rail service on existing railway tracks that would provide service from Madison to DeForest, Mazomanie, Stoughton and Sun Prairie. A proposed "starter system" between the far east side of Madison and Middleton would cost approximately $100 million to build and equip.

authority and integration of existing local transit services, schedules and fees to increase effective use, ridership and revenues across the system.

1998 Dane County Commuter Rail Feasibility Study. The next step was a feasibility study that and analyzed population projections; employment growth; and the relationships of land use, development patterns and transportation systems. Of particular concern was that:

> The potential addition of 100,000 new county residents and 57,000 new jobs by the year 2020 will add greatly to street and highway traffic in Dane County, will increase peak period traffic congestion, and will make travel times longer.

A subcommittee of the county transportation committee established as its goal:

> To examine commuter rail as part of a balanced transportation system that will, in conjunction with other transportation and land use strategies, maintain and enhance the quality of life in the region.

The objective of the feasibility study was to propose a transit system that could serve key locations for high density employment and residential areas, retail centers, major medical

facilities, Capitol Square and the University of Wisconsin, as well as special events at Camp Randall Stadium, Kohl Center, Dane County Expo Center and Monona Terrace. Other goals for the system were to reduce traffic congestion, promote public and private investment in urban development and ensure cost-effective use of transportation dollars.

The study, conducted by Parsons Brinckerhoff Quade & Douglas, Inc., found that it would cost $90 to $104 million to build a "starter system" from East Towne on Madison's far east side to Greenway Center in Middleton on the west. (This line would later be expanded to Sun Prairie at the east end and Mazomanie at the west end.) A full 64-mile system, which would also include north-south service from DeForest through Madison to Stoughton, would cost roughly $221 to $281 million in capital costs.

Although a Dane County commuter rail system would not require acquisition of new land, substantial upgrading of freight tracks, plus double tracking in key areas to permit frequent service, would be required. Annual operations and maintenance costs are estimated at $5.4 million for the starter system and $11.2 million for the full system. Dane County daily transit trips were projected for 2020 by type of service: "bus only" (41,500), "bus and starter rail" (46,900) and "bus and full rail" (52,400), compared to the 37,400 bus trips per day for Madison in 1997.

The study described the different types of equipment that could be used in a commuter rail system, including a "hybrid" self-propelled Diesel Multiple Unit (DMU), such as the Siemens RegioSprinter. If Dane County decides to proceed with development of a commuter rail system, and wishes to seek federal funding, the next steps would be a "Major Investment Study" and an environmental impact statement, followed by final design and construction.

A number of medium-sized metropolitan areas, including Dane County, are considering newer lightweight, self-propelled diesel rail vehicles, such as the Siemens RegioSprinter shown here. These "hybrid" rail vehicles are said to be more economical than conventional commuter rail for purposes of lower-density suburban service. They can also stop and restart quickly enough to provide service between closely spaced stations within a city.

IV. OVERVIEW OF RAIL TRANSIT FINANCING

Although some metropolitan areas have started or extended their urban rail transportation systems solely with local funding and farebox revenues, most public transportation systems have been built with financing from more than one level of government.

Federal. Federal funding for public transportation is provided through the Federal Transit Administration (FTA), under various programs that offer assistance for both capital and operating costs. Awards are sometimes made on a competitive basis, and they usually require that local governments provide a matching percentage of 20%-50%, depending on the particular program and use of the funding.

Although federal assistance for mass transit in general has been declining, new programs in the 1990s have offered some new opportunities for funding. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) provided some flexibility in allowing half of federal transportation funding to be used either for highways or transit, leaving much of the decision-making to the states. A small portion of the funding was reserved specifically for alternatives to the highway system. (Even before ISTEA, Portland (1986) and Sacramento (1987) were able to finance their rail systems by using federal money originally designated for new highway construction.)

ISTEA has been succeeded by the Transportation Equity Act for the 21st Century (TEA-21), which Congress passed in May 1998. TEA-21 maintains much of the transportation planning process of ISTEA but provides some additional flexibility. To receive funding, a transportation plan must include projects and strategies to:

- Support the economic vitality of the metropolitan area
- Increase the safety and security of the transportation system for motorized and nonmotorized users
- Increase accessibility and mobility options for both people and freight
- Protect and enhance the environment, promote energy conservation and improve quality of life
- Enhance the integration and connectivity of the transportation system, across and between modes, for both people and freight
- Promote efficient system management and operation
- Emphasize the preservation of the existing transportation system

Funding authority for fiscal years 1998-2003 under TEA-21 is at least $175 billion for highway funding and $36 to $41 billion for transit. Those figures are a 50%-74% increase over transit funding under ISTEA. Metropolitan areas as small as Galveston, Spokane (about the size of Madison), Little Rock, Stockton, and Albuquerque have already been authorized for possible funding final design and construction (FD&C) under TEA-21. Funding for the Milwaukee area's East-West corridor also remains authorized.

One change in the rules for the formula grants under TEA-21 is that transit systems in metropolitan areas larger than 200,000 population can no longer use the program for operating expenses, although preventive maintenance is now considered an eligible capital expenditure. Funds can be provided for air quality improvement in nonattainment areas or maintenance in former nonattainment areas. Funding is also available for job access, reverse commuting and transit pass programs.

State. State funding specifically earmarked for start-up, capital or operating costs of urban rail is extremely limited. In the past, the legislature did, however, appropriate funds for multimodal transportation studies and for Milwaukee urban rail planning studies. Section 85.063 (3), Wisconsin Statutes, authorizes grants to urban areas of more than 50,000 population for property acquisition for an urban rail transit system (upon completion of a planning study), but the legislature has not appropriated any funds to date for those grants.

State funding for railroads or for transit systems, though not specifically targeted for urban rail transit, might be available to help finance construction and other capital costs. For example, a 1996 commuter rail study for Dane County speculated that the state's freight railroad assistance program could be available to help finance track upgrades. Although the statute is aimed primarily at freight rail, it does include language that refers to increased passenger service. If urban rail service were to operate on shared tracks with freight rail, both could benefit from track upgrades.

Currently, transit systems serving populations of 2,500 or more are eligible for state assistance with operating costs. Eligible modes of mass transit include bus, rail, shared taxicab, and any other conveyance that provides the public with general or special service on a regular and continuing basis. Local governments must provide a match from non-fare revenues (primarily property taxes) of at least 20% of the state aid received. Statewide, the state share of transit system operating expenses is just over 40%, with the remainder financed by federal and local sources.

Local. County and municipal government funding for roads and transportation comes from local property taxes and also, in some cases, the sales tax. Local funding includes farebox revenues, which typically offset between 20% and 40% of total operating costs in southern and southeastern Wisconsin transit systems. (Statewide, farebox recovery is about 30% of operating expenses.) State aids influence the proportion of costs local property taxes must fund through the limits on the state share and requirements for the local match, which by law cannot be met by increased ridership and fare revenues. Statewide, the local non-farebox share averaged just under one-fifth of total operating costs. The local percentage match for some larger transit systems – including Madison, Waukesha city and county, and Appleton – is considerably higher than the state average.

V. APPENDICES

APPENDIX A: DESCRIPTION OF URBAN RAIL TRANSIT OPTIONS

COMMUTER RAIL

Commuter rail, as it is usually understood, falls between intercity passenger train service (such as Amtrak) and urban rapid transit, extending metropolitan transit service to suburban or rural localities. Commuter rail corridors typically extend 30 miles or longer and are separated from automobile traffic. The trains are usually unpowered single- or bi-level passenger coaches, propelled by conventional diesel or electric locomotives on standard tracks, either on a line dedicated to passenger traffic or on tracks shared with freight traffic. Commuter rail can provide relatively fast and direct service for riders who travel the longest distances within a metropolitan area.

Suburban rush-hour service, widely-separated stations. Commuter rail lines generally provide peak-hour service between one or more stations in a central city to widely separated stations (typically 3 to 6 miles apart) in distant suburbs and rural areas for commuters who live in outlying areas and work in the city. Service may be scheduled to serve "reverse commutes" as well. One reason for the wide separation between stations is that diesel locomotives require longer distances than other forms of rail to slow down, stop and resume full speed. Commuter rail is not well suited to provide service *within* a city; other forms of rail technology are better for the "stop-and-go" service between closely spaced stations.

Commuter rail service between suburban or rural locations and central cities can be provided either by a locomotive pulling or pushing single- or bi-level passenger coaches (left) or by self-propelled diesel or electric rail cars (right).

Access to stations. Wide separation of stations enables the trains to take advantage of their speed over long distances but also means that stations outside of downtown or town square locations are beyond walking distance for most riders. Passengers arrive either by private automobile or feeder bus service. Park-and-ride lots at suburban stations are common, although some stations may provide only drop-off or "kiss-and-ride" zones. In some large metropolitan areas park-and-ride lots are in short supply. Secure bicycle parking is less com-

mon. Some systems are beginning to offer "bike-and-ride" options that allow commuters to take their bicycles aboard the train. Commuters can continue their trips by bicycle after leaving the train.

Infrequent service. Traditional commuter rail service is relatively infrequent, compared to other forms of rail transit. Trains may be scheduled only a few times per hour during peak periods. Late night or weekend service may be limited or nonexistent. Although many systems do provide service throughout the day and on weekends, the interval between trains may be an hour or more during off-peak periods. Time between trains can be a deterrent to use, particularly for those whose travel originates closer to the city, because the trip to the station and waiting time between trains becomes a larger proportion of the total trip length, which may make driving more attractive. ("Regional rail" is a term now coming into use to describe systems that provide significantly more service throughout the day, rather than primarily during rush hour periods.)

Part of a multimodal system. Most areas that have commuter rail serving outlying suburbs, such as Chicago's Metra and Chicago Transit Authority (CTA) services or Boston's Massachusetts Bay Transportation Authority (MBTA), also have subway or light rail services within the core urban area. Commuters can transfer between these various rail modes to complete their trips. Transfers to other modes of rail or to bus transit may or may not be included in the fare. Although most existing commuter rail systems serve larger metropolitan areas and are integrated with light rail or rapid rail service, cities as small as Burlington, Vermont (city population of about 40,000 and metro population slightly over 150,000, which is comparable to the Janesville-Beloit Metropolitan Statistical Area) are working on new commuter rail projects. Smaller cities that build commuter rail systems would be unlikely to build light rail or subway as well. They probably would continue to rely on buses for transportation within the city.

In many cities, passengers can connect between commuter rail and light or heavy rail trains, as illustrated by a MARC commuter rail train (right) and Baltimore Central Light Rail train(left) at Oriole Park at Camden Yards, Baltimore.

Characteristics of on-board service. Commuter trains may also offer more comfortable seating than buses, light rail or subways. Some commuter rail lines, such as the West Coast Express between Mission and Vancouver, British Columbia, offer additional amenities, including on-board food and beverage service, computer plug-ins, cellular telephones and work tables.

Capital costs. The capital costs for commuter rail can be substantially lower than light rail and heavy rail, particularly if there is already a downtown passenger terminal and access to rights-of-way. Capital costs for commuter rail average $1 to $3 million per mile, about one tenth of the cost for building an electric light rail system. If existing tracks do not require sub-

stantial upgrading, a commuter rail system can be implemented in a relatively short period of time and at low cost compared to other transit options or expanded highway construction.

HEAVY RAIL

"Heavy rail" usually describes large city subway or elevated train systems. It generally refers to electric trains, operating on completely separated rights-of-way and serving high passenger volumes with frequent all-day service at high-platform stations. Power is provided by an electrified third rail rather than overhead wires or diesel fuel.

The word "heavy" in the description refers to the intended passenger volumes, rather than the physical characteristics of the trains, tracks and stations. The nature of the required equipment and stations makes the initial capital costs of heavy rail considerably more expensive than light rail or commuter rail.

Heavy rail rapid transit trains can serve either elevated stations or underground subways within densely populated central cities, as illustrated by the Chicago Transit Authority "El" train (left) and Washington, D.C. Metro subway station (right). Service outside the central city is often above ground in freeway medians or other fully grade-separated rights-of-way.

Length of routes and separation between stations varies in heavy rail service, but both are usually shorter than for commuter rail. Park-and-ride facilities are often provided at stations outside the central urban area, but the closer spacing of stations allows significantly more riders to reach stations on foot or by short bus rides.

Heavy rail typically operates in large cities, such as Boston, Chicago, New York, Philadelphia and Washington, D.C., as part of a multimodal urban rail system that includes commuter rail or light rail service. Neither Madison nor Milwaukee is considering a heavy rail system.

LIGHT RAIL TRANSIT

Light rail transit (LRT), which is the most prevalent form of urban rail transit, operates in about 350 cities worldwide. Generally speaking, LRT refers to service by a rail vehicle powered by overhead wires rather than an electrified rail. Light rail is also distinguished from heavy rail in that it uses shorter trains of 1 to 3 cars, as appropriate for lower passenger volumes. Additional cars can be added as needed. LRT encompasses a wide range of electric rail transit technology and service, from trains having some features of what might be called an updated version of the traditional streetcar, to more elaborate operations resembling "heavy rail" rapid transit in some respects.

Frequent all-day service to closely spaced stations. Like heavy rail, LRT provides frequent all-day service to stations that are closely spaced within a mile of each other or less in core urban areas. This permits greater pedestrian access and may reduce transfers in downtown areas. LRT can serve closely spaced stations because light rail vehicles can stop and start more easily than traditional commuter rail equipment.

Light rail transit serves closely spaced downtown stations and stations further apart outside downtown, many with park-and-ride facilities, as illustrated by this Cleveland light rail train.

Placement of service. Power from overhead lines, rather than an electrified rail, provides additional flexibility because motor and pedestrian traffic can safely cross the tracks. Light rail vehicles (LRVs) can run either in a separated right-of-way or on rails in the street, and in the grade-separated rights-of-way, LRVs can travel nearly as fast as commuter rail or heavy rail. Unlike the streetcars of an earlier era, which operated in the middle of regular automobile traffic, the on-street LRT operations are generally separated from traffic except to cross intersections. Traveling alongside traffic removes conflict with cars and also eliminates the kinds of delays buses would face in waiting for a break in traffic to resume travel from a bus stop. To maintain its advantage over cars and buses, in-street LRT needs signal preference at intersections to eliminate the waiting for traffic lights. The flexibility of operating without complete separation allows LRT to transport people closer to their destinations without the high cost of building underground stations.

Length of corridors and access to service. Light rail corridors vary considerably in length, from a single line of 5 miles to multiple lines of 20 or more miles each. The length and number of lines in a system affects the type of service provided. In cities with longer lines or multiple lines traveling in different directions, a passenger is more likely to be able to use rail, rather than having to resort to bus or automobile. Short LRT systems may provide for easy travel through and within downtown and may significantly reduce bus trips. This cuts down on congestion and diesel emissions, but the commuter may need to travel longer distances by car or bus to reach the LRT. When service is extended to the suburbs, stations are located further apart, but usually not as far apart as commuter rail stops.

HYBRIDS: ADVANCED LIGHT RAIL TRANSIT AND DIESEL MULTIPLE UNITS

Advanced Light Rail Transit (ALRT) combines features of light rail and heavy rail. ALRT cars travel on steel rails on a "dual guideway" (one set of tracks for each direction) in an exclusive right-of-way, and capital costs for ALRT are higher than for regular LRT. The automated cars operate by on-board computers that communicate with a central system management center where a human operator handles scheduling, rerouting, system startup and shutdown, and emergency procedures.

The primary example of ALRT is Vancouver's SkyTrain, which provides service every 2 to 5 minutes with 2- and 4-car trains that operate on elevated track after leaving the downtown underground stations.

Diesel Multiple Units (DMUs), which operate on standard railway tracks, can offer hybrid service with characteristics of both commuter rail and light rail. DMUs are self-pro-

pelled and can operate as single vehicles or multiple car trains. Newer DMU technology enables trains to stop and accelerate more quickly and in a shorter distance than traditional commuter rail, which makes them practical for serving closely spaced stations within a city, as well as traveling between suburbs and the city.

A DMU system can be built relatively quickly and serve as a starter system for cities that cannot easily afford the up-front costs of an electrified system. The newer DMU technology has been in use in some European urban rail systems, but only recently have they been considered in the United States, including Austin and Madison. Depending on whether there are existing tracks in good condition, DMU capital costs range from $3 to $10 million per mile, as contrasted to $10 to $45 million for electrified light rail. DMU operating costs, however, are higher than electric systems.

APPENDIX B: SELECTED URBAN RAIL TRANSIT SYSTEMS

This appendix provides brief profiles of urban rail transit systems in nine North American cities that are comparable in size or density to Milwaukee or Madison.

BALTIMORE, MARYLAND

City population: 675,401, 15th largest U.S. city.
Combined population of Baltimore (city) and Baltimore and Anne Arundel Counties: 1,858,842.

Baltimore offers an integrated system of rail transit that combines commuter rail, subway and light rail. The Maryland Mass Transit Administration operates the Baltimore Metro Subway, a 15.5 mile / 14 station line from downtown Baltimore northwest to Owings Mills, and the 30 mile / 32 station Central Light Rail Line from Timonium in suburban Baltimore County, through Baltimore City, past Oriole Park at Camden Yards and south to Glen Burnie in Anne Arundel County. A 4.5 mile light rail extension, opened in September 1997, was designed to serve both southbound commuters and reverse commuters who live in the city and work in the suburbs. LRT service connects to Penn Station and Baltimore-Washington International Airport, thereby providing an intermodal connection to airlines and commuter trains.

LRT service is less frequent in Baltimore than other systems (trains operate 17 minutes apart) because significant portions of the line are single track and funding for double track upgrades is not expected to be available for several years. The line runs in its own right-of-way outside of downtown and alongside the street at slower speeds through downtown. In the on-street portion, trains do not get signal preference at intersections but must wait at red lights.

Daily ridership on the Central Light Rail Line was about 25,000 before the extensions and is projected to rise to 36,000 by 2000. Full cash fare is $1.35, but downtown fares were reduced to 50 cents as part of a 2-year trial program to reduce automobile use for short trips.

BUFFALO, NEW YORK

City population: 310,548, 54th largest U.S. city.
Erie County: 954,021.

Buffalo's 6.4 mile / 14 station Metro Rail system opened in May 1985 and serves an average of 25,000 weekday riders daily. Including weekend use, 7.2 million passengers rode Metro

Rail in 1997. The line runs between downtown and the South Campus of the University at Buffalo near the city limits. The system was originally intended to extend to the North (main) Campus in suburban Amherst, but funding was insufficient for a longer system. Unlike most light rail systems, significant portions of the line are underground. The system was originally designed as a fully grade-segregated metro but was modified to street level service for the downtown portion because of the limited funding.

Metro's light rail service operates 18 to 19 hours per day, but only nine hours on Sundays. Trains run every five to six minutes during peak times, with 10-minute headways most other times (except 15 minutes on Sundays and 20 minutes for late night service). City and suburban bus routes, which carry an average of 69,500 riders per day, are timed to connect with the trains, except during the rush hours, when the five minute interval already provides for a prompt transfer. No fare is required to ride the train between any of the six aboveground (downtown) stations; otherwise the regular fare is $1.25 ($1.15 with tokens), with free transfers between rail and bus.

The Niagara Frontier Transportation Authority (NFTA) was created to provide Erie and Niagara Counties with a multimodal land, air and water transportation system. In addition to setting policy for Metro Bus and Rail, it also oversees the Greater Buffalo and Niagara Falls International airports. Metro has historically received some funding from the profits of Greater Buffalo International Airport, but that is being phased out as a result of Congressional action in 1994 that threatened to cut federal funding to airports that use profits for non-airport purposes. That restriction, as well as other funding cuts and increasing costs for services for disabled riders, led to fare increases and service reductions. Despite opposition from suburban riders, NFTA voted in fall 1995 to curtail service on nine suburban bus routes and trim 16 other routes that ran deficits.

With a rail line that stops at the city limits and reductions in suburban Metro bus service that feeds the LRT, some perceive that the transit system primarily serves city residents. Given that most local transit funding comes from the Erie County sales tax, suburban residents may resist funding a system that provides them with less service, even as suburban employment and retail business continue to grow.

CALGARY, ALBERTA (CANADA)

Metropolitan population: 821,628 (1996 Census).

Calgary Transit's "C-Train" service opened in May 1981 with a 12.9-km line extending south from downtown. A 9.8-km northeast leg opened in April 1985 and a 5.6-km northwest leg (University area) opened in September 1987 and another 1.0-km was added in August 1990. The entire 29.3-km, 3-leg system provides service to 31 stations with 5-minute headways during peak hours, reduced to 15 minutes off-peak. Fares are approximately $1.10 U.S. for single tickets or 10 tickets at about $8.80 U.S.; various passes and reduced fares are also available. Trains run in separated rights-of-way, except in the downtown zone where they share a transit mall with buses and emergency vehicles. Travel in the 11-station downtown zone is free. Express buses are available in places that are still 20 minutes or more by feeder bus from a C-Train station. Many stations have park-and-ride lots. Daily average ridership in 1997 was 148,500.

DALLAS, TEXAS City population: 1,053,292, 9th largest U.S. city.
Dallas County population: 2,000,192.

Dallas Area Rapid Transit (DART) currently operates a 20-mile / 20-station, 2-line Light Rail Starter System and the Trinity Rail Express commuter rail service. Trinity Rail Express currently operates between Dallas and Irving, but extensions to Fort Worth in 1999 and to Dallas / Fort Worth International Airport (DFW) in 2005 are planned.

In 1984, when DART decided to pursue light rail transit as the preferred mode for the state's most congested metropolitan area, it was planning a 147-mile network serving the city and suburbs. Plans were scaled back to a 93-mile system after DART determined in 1985 that revenue through 2010 would not be sufficient to build the system as originally envisioned. By 1995, the plan for 2010 was changed again to include 53 miles of light rail transit, 98 miles of High Occupancy Vehicle (HOV) lanes and 37 miles of commuter rail transit, linking Dallas and Fort Worth with extensions to DFW and the Interstate 35E corridor. The revised plan also incorporated ridesharing; telecommuting and other trip reduction support programs; the use of smaller transit buses; and redeployment of existing buses with the initiation of rail services. The starter system opened on time and within budget in June 1996; the initial 10-mile commuter rail segment, connecting Dallas and Irving, opened nearly six months later.

DART plans to extend the existing light rail service earlier than originally planned, by adding two more lines between 2001 and 2003 to meet increased demand. Two additional lines are scheduled for service by 2005 and 2008. One of them was originally planned for lightweight diesel railcars, which would save infrastructure costs by using existing tracks, but the large number of grade crossings on the 14-mile line and the popularity of LRT may lead DART either to cancel the project or change it to electric service, which would place additional strain on DART's finances.

Commuter trains run every 25 minutes during peak periods, and hourly from 9 a.m. to 3 p.m. and 7 to 11 p.m. Daily commuter rail ridership is about 1,200. Light rail trains are 5-10 minutes apart during peak hours, 10-20 minutes at other times. LRT averages almost 35,000 passengers daily, and DART has ordered more LRVs to relieve crowding on the trains. The basic LRT (and bus) fare is $1, with day passes for $2 and 11-ride packs for $10. Express buses cost $2, and Trinity Rail Express is $1. Rail service within downtown is 50 cents for 90 minutes. DART also offers "Rail Runner" circulator bus service to 40 locations throughout downtown to facilitate connections between bus and rail. In 1997 DART introduced "Epass," an annual transit pass employers can buy for every employee for as little as $24 / year.

The apparent success of LRT in Dallas surprised many, considering the automobile-orientation of the area and the nature of its suburbs. Some have also credited the transit system with playing a role in new economic development downtown and near some of the stations.

DENVER, COLORADO

City population: 497,840, 26th largest U.S. city.
Denver PMSA population: 1,866,978.

Denver's Regional Transportation District (RTD) operates a 5.3-mile light rail line, which opened in October 1994. It was built without federal funding or new local taxes. The existing line and the southwest corridor are part of a planned eight-corridor transit system. An 8.7-mile Southwest Corridor extension, which will add five more stations to the system, is expected to be completed and in service in July 2000.

The existing line has 14 stations and operates from 4:30 am to 1:30 am with trains 6 minutes apart during peak hours and 12 minutes most other times. Depending on demand, trains operate with 1 to 3 cars. The LRT uses a restricted right-of-way south of downtown and runs at street level from downtown to the north end of the line. Trains do not receive signal priority at downtown intersections, but the issue is being studied.

LRT fares are the same as those for local buses ($1.25 during peak hours and $.75 at all other times for single ride tickets, with discounts for 10-ride tickets and passes) and include transfers between LRT and buses.

Ridership during the first year exceeded projections by so much that the RTD had to restore more than 100 of the 560 bus runs scheduled for removal from downtown streets until it could purchase additional LRVs to relieve the overcrowding. Many consider rapid transit to be a success in Denver, in that ridership has been sufficient to merit expansion of the system, but its development has been and continues to be contentious. A "Guide the Ride" proposal to pay for long-term studies and construction of up to 81 miles of new LRT, plus HOV lanes and park-and-ride facilities in the eight corridors was defeated at the polls in November 1997. The cost of the package would have been $5.9 billion over 38 years. Critics, including some RTD board members, opposed the new tax and lack of specifics in the proposal. Major investment studies (MIS) for four corridors, however, continue to identify possible solutions that would make Denver eligible for federal funding and could result in a revised ballot measure.

One MIS has been completed for the Southeast Corridor where light rail was recommended to relieve the severe congestion on south I-25. Proposals for widening the highway would displace about 700 residences and businesses, but transit designers say light rail could be built almost entirely on existing state property and would displace only 34 residences and businesses.

PORTLAND, OREGON

City population: 480,824, 27th largest U.S. city.
Portland-Vancouver, OR-WA PMSA population: 1,758,937.

Portland, Oregon, is often cited as a leader in land use planning in the United States. In an earlier era, communities developed along rivers and railroads, and after World War II, highways influenced the location of newer communities farther away from the central cities. Today, Portland is praised for trying to develop communities around public transportation. The Federal Transit Administration has called Portland a pioneer in land use planning and connecting businesses and neighborhoods to convenient access to transit. Portland was also the first LRT system to use low-floor light rail vehicles, which offer direct access for people with disabilities without the use of ramps or wheelchair lifts. Critics of Portland's light rail system, however, note that area highways are still congested, that a portion of the bus system

has been reoriented to connect with light rail rather than providing trips directly downtown, and that rail has been expensive.

Portland's Tri-County Metropolitan Transportation District (Tri-Met) operates the Metropolitan Area Express (MAX) light rail as part of its transit system. MAX was originally a 15-mile line between Portland and Gresham (east of Portland), but construction of a Westside extension began in 1994. Westside MAX from Portland to Beaverton and Hillsboro in Washington County, which includes a three-mile tunnel through the West Hills, opened in September 1998 and added another 18 miles to the system for a total of 33 miles and 50 stations. The extension was completed within budget, and 75% of the $944 million cost was federally funded. Ridership on the expanded system has increased to about 54,000 after the first month of Westside MAX service. Additional extensions are planned for north-south service and service to Portland International Airport (PDX).

Service between Hillsboro and Gresham operates 4 am to 1:30 am at 10-minute intervals throughout most of the day, with trips as frequent as 3 to 4 minutes apart during peak hours. Bus service in the region is also being expanded, with more weekend and evening service replacing a number of formerly commuter-only routes. A total of 3,700 park-and-ride spaces will be available at nine of the stations.

Fares are scheduled to increase 5 cents every other year, and the September 1998 increase raised the two-zone cash fare to $1.10 (or 10 tickets for $10.00) and the all-zone fare to $1.40 (or 10 for $13.00). MAX and bus travel within a large downtown "Fareless Square", however, is free throughout the day.

The planned $182.9 million, 5.5 mile / 4 station extension to PDX is being financed by local and private funding and could open as early as 2001. The public-private financing arrangement, which will involve no federal or state funding and no new city property taxes, is believed to be the first of its kind in the United States. Bechtel Enterprises would finance part of the project in exchange for the right to develop 120 acres of mixed-use, transit-oriented commercial development on Port of Portland property.

Pending reapproval by voters in November 1998, the first 10 miles of a 16.4 mile, 27 station South / North MAX from Clackamas County into North Portland could open by 2004. The South / North MAX is back on the ballot because the original proposal approved by voters would have crossed the Columbia River into Vancouver, Washington, to relieve severe congestion on the I-5 bridge, but Clark County (Washington) voters rejected a tax plan to pay for their share of the project.

Portland is also looking to an older mode of rail transit. The city council approved local funding to match a federal contribution for a Central City Streetcar project, a 4-mile loop that will serve Portland State University and connect with MAX. It is intended to encourage residential development in two undeveloped parcels of land close to downtown. The proposed streetcars are of a newer design with a wheelspan that would allow them to operate on the light rail tracks if needed. Unlike MAX, however, the streetcars would operate in mixed traffic. The project would be the first all-new streetcar project in the U.S. in almost five decades.

SACRAMENTO, CALIFORNIA

City population: 376,243, 42nd largest U.S. city.
Sacramento County population: 1,117,275.

Sacramento's 18.3-mile light rail system opened in 1987 after continuing expansion of Regional Transit District bus service proved inadequate to keep up with growth in the capital city's suburbs. Light rail trains operate from 4:30 am to 1 am daily, with service intervals of 15 minutes during the day and 30 minutes at night. Basic cash fare is $1.25 or 11 tickets for $12.50. Central city zone service is 50 cents. The system serves 30 rail stops, including eight transfer centers and nine free park-and-ride lots. While many medium-sized transit systems have declined in use, in its first 10 years of operation, Sacramento's combined bus and rail ridership increased about 80% to more than 25 million passengers for FY 1997. Weekday light rail usage averages 28,000 riders daily, or 30% of the total system ridership. The 1997 figure has already exceeded the projection originally made for the year 2000 by 8%. Bus ridership also continues to increase, with an average of 64,000 passengers per day.

The light rail line now extends northeast and east from downtown Sacramento. A 2.3-mile extension of the east leg opened in September 1998, bringing the system to 20.6 miles. (An extension of the east leg will eventually connect Sacramento with Folsom.) Construction of a 6.3-mile South line from Sacramento to South Sacramento, scheduled to begin in 1999, is projected to increase daily ridership by 15,000 by providing service to some of the area's most transit-dependent neighborhoods.

Funding for the South line includes a one-mile light rail spur to a planned intermodal facility, which will connect light rail with Amtrak, local and commuter buses, and other services. Eventually, this project will continue on to the Sacramento International Airport, with projected completion in 2003. The $222 million South line projects will receive $111 million in federal funding, with the other half funded by state and local resources. The extensions now underway and planned will increase the system to almost 39 miles.

ST. LOUIS, MISSOURI

City population: 351,565 47th largest U.S. city.
Combined St. Louis city, St. Louis County, and Madison and St. Clair Counties (IL) populations: 1,875,798

St. Louis' MetroLink, operated by the Bi-State Development Authority, opened in July 1993. The 17-mile LRT system includes 18 stations between Lambert International Airport in northwestern St. Louis County and East St. Louis in St. Clair County, Illinois, with plans for expansion into other parts of the metropolitan area. All of the stations are served by regular bus routes and / or shuttle vans, eight have free park-and-ride lots, and bicycle riders may take their bikes on the train.

LRT service operates about 20 hours a day with 7-8 minute headways during the weekday rush hours, 10 minutes midday and 15 minutes at night. Weekend headways are 10 or 15 minutes during the day and 15 or 30 minutes for late nights and early mornings. The fare is $1.00 for a single ticket or 12 rides for $10.00, with weekly and monthly passes also available. Midday travel downtown is free.

Average weekday ridership for FY 1997 was 42,500, about double 1993 ridership, which itself exceeded initial projections. Ironically, the success of MetroLink has led to financial difficulties. As MetroLink ridership increased, the demand for bus service has risen (bus usage has

also increased to 130,000, reversing the pre-MetroLink declines in ridership) and the system faces fare increases or service cuts in response to reductions in federal funds for mass transit operations.

Construction began in 1998 on a 17.4 mile / 8 station St. Clair County extension to Belleville Area College. The extension is scheduled to open in September 2001. (A second phase of the extension project will eventually bring the extension to 26 miles with service to Scott Air Force base and the new Mid America Airport by 2003, and service to some of the new stations will be six minutes apart.) The right-of-way may be shared with an integrated bikeway, to be funded separately. Future extensions in St. Louis County are still being discussed, and local financing still to be approved, but local officials would like to have them in service by the 2004 World's Fair.

VANCOUVER, BRITISH COLUMBIA (CANADA)

Vancouver metropolitan population: 1,831,665 (1996 census).

Urban rail transit in the Greater Vancouver region is provided by BC (British Columbia) Transit's "SkyTrain" and Canadian Pacific Railway's West Coast Express (WCE) commuter rail service. The two systems connect downtown, and the WCE fare includes free transfer to SkyTrain, as well as BC Transit's SeaBus, trolley buses and diesel buses.

SkyTrain is Vancouver's 20-station / 28.8-km Advanced Light Rail Rapid Transit system, serving Vancouver, Burnaby, New Westminster and Surrey with rush hour service every 2 to 3 minutes, and 4 to 5 minutes other times and on weekends. The system opened with an initial 21.4-km line in January 1986 and has since been extended with service to Surrey. The system has some characteristics of light rail and some characteristics of subway, or "heavy rail". Trains operate from 5 am to almost 2 am during the week, with shorter hours on Saturdays and Sundays. The basic fare is about $1.00 U.S. Fares are valid for 90 minutes in any direction, potentially allowing a rider to take a round-trip with multiple stops and boardings on a single fare payment.

In June 1998, BC Transit revised earlier plans to build a less expensive conventional LRT for an east-west line and instead began construction of a new SkyTrain line at about $760 million U.S. This system will provide faster service and operate without a driver on board. Portions of the new SkyTrain route are expected to open in 2000.

Service on the West Coast Express began in November 1995, about 31 months after a citizens' advisory committee recommended a commuter rail service using existing Canadian Pacific Railway tracks. The line provides high speed (135 km / hr) commuter rail service between Mission and downtown Vancouver's Waterfront SkyTrain station, as well as six other stations on the 65-km line. The bi-level passenger coaches offer a number of amenities, including work tables, computer plug-ins, cellular telephones, washrooms, limited food service and bicycle accommodations. Transfers to BC Transit rail, bus and SeaBus service are included in the fares. The one-way fare between Mission and Vancouver is $4.55 U.S.; other one-way fares range from $2.60 to $3.25 U.S., depending on distance. There are discounts on round trip tickets and weekly and monthly passes.

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