# THE RENAISSANCE OF RAIL TRANSIT IN AMERICA

A report by Regional Plan Association

June 1991

# *Preface*

Americans living in metropolitan areas, faced with growing highway congestion and air pollution, are turning to the operators of public transportation and asking them to "Do something about it!"

The trouble is, many metropolitan areas do not readily support public transportation systems because of the way our cities and suburbs have been built in the past 40 years.

Recognizing that land use and transportation have to relate, metropolitan areas have been turning to rail transit. Because rail transit represents a long-term investment, it can draw long-term development to its stations and begin to reestablish a closer relationship between land use and efficient transportation. This is long-range planning.

Some academics have evaluated recent rail investment on the basis of short-term operations and costs. They have been critical of several of those projects.

Public transit agencies were caught between growing public sentiment for rail as a solution to congestion and dirty air and the criticisms of recent rail projects. Through their organization, the American Public Transit Association, the Regional Plan Association was asked to evaluate the situation.

Regional Plan has conducted two large studies for the U.S. Department of Transportation, "*Urban Rail in America*" and "*Public Transportation and Land Use Policy*." The Association is the oldest regional planning organization in the country and has greatly influenced the transportation and development pattern of its area, the Tri-State metropolitan region centered on New York City.

This Regional Plan report was written by William B. Shore, Senior Fellow of the Association, with the very helpful advice of members of the American Public Transit Association.

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## SUMMARY

Rail transit serves and shapes more and more urban and suburban areas all over the world, prosperous and poor, on every continent.

In the U.S., 15 new regional rail transit systems have been added since World War II to the 20 still operating from before the war. At least 18 more metropolitan areas are building, planning or seriously considering new rail transit systems. Nine of the new or prospective systems are in the home of the freeway, California, whose citizens just approved a new statewide tax for public transportation.

How, in our spacious metropolitan areas, can rail transit work? Why do we need it? There is a seven-point explanation:

1. Metropolitan areas are where a majority of Americans live, and that share is growing. They are the centers of the economy--increasingly important as the economy becomes global.

2. Transportation in these metropolitan areas is in trouble. The Federal government estimated that urban highway congestion cost the U.S. 1.4 billion gallons of gas and travellers over $9 billion in time and other costs in 1988. Congestion not only plagues city centers; it is driving business farther and farther out, from suburbs to exurbs, further aggravating congestion on our roadways.

3. Because jobs are scattered and housing spread out, it is difficult for people to ride to work together--so the average number in each car, already close to one, continues to drop.

4. One essential means of encouraging people to ride together is to cluster a larger share of offices, shopping and residential development around high-capacity public transportation stops so more people go to and from the same place and can travel together.

5. Rail transit can achieve such clusters because it represents to developers and employers an investment in fixed facilities that will be in place for the long term.

6. When well-planned rail service is used to concentrate housing, jobs and services around its stations, it attracts people from their automobiles. Furthermore, the increase in density decreases auto use not just to work but for all travel.

7. Only rail transit can efficiently serve the centers of our large urban areas and maintain their human character and attractive environment.

As a result, these principal generators of American economic activity, our metropolitan areas, are looking to rail transit to help cure the growing inefficiency of our regional transportation networks. At the same time, rail transit contributes strongly to major national goals:

-- cleaner air;

-- less dependence on foreign oil;

-- places that foster a sense of community; and

-- a greater opportunity for those without cars--not only poor and new arrivals but the fast-growing aging population.

In addition, rail transit is beginning to offer effective access for inner-city residents to increasing suburban jobs and for the growing number of elderly and disabled persons to the jobs, shops and services they need.

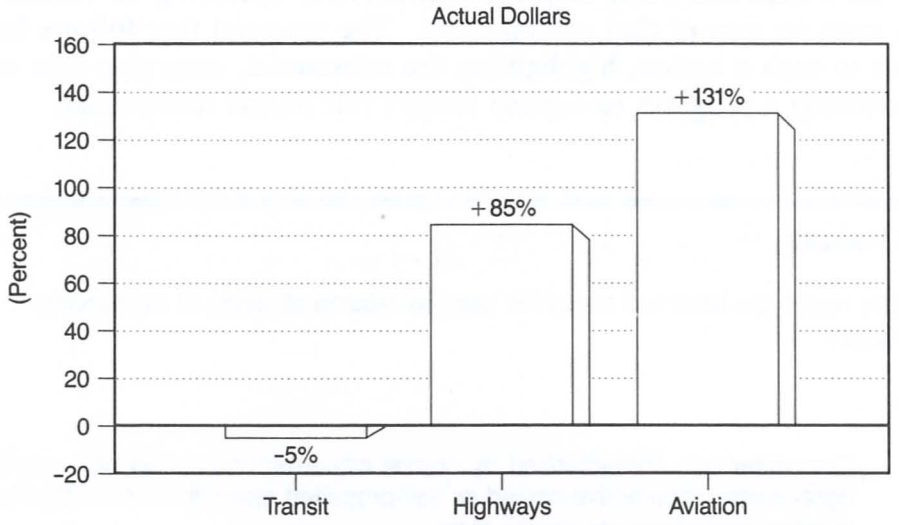
All of these reasons have combined to create a renaissance for urban rail, in the U.S. and around the world. State and local governments are supporting this new investment with increasing contributions, often supported by popular vote. But the federal government's support has been declining.

In the last decade, U.S. investment in transportation has lagged behind the cost of living, despite a study of industrial countries showing that higher investment in public facilities results in higher productivity in the private sector.

In addition, public transit's share of U.S. transportation investment declined precipitously in the 1980's compared to highways, despite growing recognition that added highway space does not relieve the nation's most rapidly growing areas of congestion (specifically the suburbs of growing metropolises) as inexpensively as public transit can.

# Percentage Change in Federal Spending

## Transit, Highways, & Aviation 1981 – 1991




| | Transit | Highways | Aviation |
|---|---|---|---|
| FY 1981 — | $3.9 B | $ 8.8 B | $3.2 B |
| FY 1991 — | $3.6 B | $16.4 B | $7.3 B |

Source: Southeastern Pennsylvania Transportation Authority

While American metropolitan areas have turned to rail transit to meet transportation and air quality crises, Europe and Japan have used rail transit to shape development to prevent these crises. American metropolitan areas should plan their growth that way.

Other developed countries have much higher transit ridership and less car use than the U.S. because: their development pattern encourages it; the cost to drive is much higher; they invest much more in public infrastructure; and, levels of government above the local level have planned and built regional public transit and related it to land use.

In the U.S., the federal government should reestablish itself as a partner and investor along with state and local government in a concerted attack on inefficient metropolitan movement that threatens our competitiveness in the new global economy and our quality of life.

This nation needs the same long-term commitment to an efficient metropolitan transportation system as was made to the Interstate Highway system nearly 40 years ago. A nine-point program to achieve this is outlined in Chapter VII. Urban rail transit and other high-capacity services operating on exclusive rights-of-way must be part of that commitment. The material that follows lends strong support to such a notion, highlighting the substantial, emerging role of rail transit and outlining a program to expand today's rail transit renaissance.

**What is Rail Transit?**

Throughout this report the term "rail transit" is used to refer to all kinds of rail serving metropolitan areas.

Included are:

- Commuter rail...characterized by central city-suburban routes on exclusive right-of-way, locomotive-hauled or self-propelled operations, multiple-trip ticketing and station-to-station fares.
- Heavy rail...also known as subway, elevated or metro systems operating on exclusive right-of-way and characterized by high capacity, electric power, multi-car trains, sophisticated electronic signaling, high speeds and high platform passenger loading.
- Light rail...also known as streetcars or trolley cars operating on either exclusive or shared right-of-way and characterized by moderate capacity, electric power, multi- or single-car trains, high or low station platforms and automated or manual operation.

In recent years, facilities also have been constructed for exclusive use by transit buses as well, resulting in a somewhat lower capacity and less capital-intensive transit option on separate right-of-way.

# I

## INTRODUCTION

Fly over the United States, you see mostly empty space. Get off the plane in almost any metropolitan area and you're into highway congestion.

Stay in the metropolis awhile; you'll hear a political storm against growth.

Despite that pressure, for every person added to non-metropolitan areas of the U.S. between 1980 and 1990, nearly nine were added to metropolitan areas of over a million people. In 1990, three-quarters of all Americans lived in metropolitan areas, half in the 35 metropolitan areas with at least a million people, a third in the dozen with over 2.5 million people.

Why do people settle there in spite of travel problems and opposition to growth?

1. They grew up there; they have links.

2. The economy requires a large labor pool; it is becoming more specialized.

3. The economy is becoming more complex, businesses are connected to other businesses.

4. Families need a large job pool to choose from because each has two or three workers with different skills and career interests.

5. Many of the most talented in the nation are attracted to the stimulation, challenge and choices available in larger urban areas.

6. Cities are a haven for the increasing immigrant population. Low-cost housing and people from many countries attract relatives and friends.

7. Growing populations create a larger market which attracts more business to serve it.

Plentiful vacant land around metropolitan areas actually contributes to the highway congestion. First, efforts by each suburban government to limit housing push housing outward from the center. Then enterprises move outward, too, pursuing the retreating labor force. The leap-frog effect continues as housing is pushed even further away as local governments that once accepted affordable housing now try to constrain growth after accepting jobs. As jobs and housing and services move outward, each uses more land, spreading development further apart and increasing the miles one must travel to work, to shop, to enjoy oneself.

Growing distance between home and other daily destinations not only means more vehicle-miles travelled. Spread-out homes and scattered jobs and services mean that people can't easily ride together--so, the dominance of the "single occupant vehicle." Making room for the car further spreads facilities. Office workers require 200-250 square feet of space; their cars need 400 square feet at each destination whether at the office, at commercial centers or at home.

Some metropolitan areas now see that the efforts to alleviate congestion cause more congestion and efforts to stop growth simply spread it.

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**Many metropolitan areas are reassessing how to manage growth. Urban rail is part of their solution.**

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Elsewhere in the world, virtually all major cities have urban rail transit: 56 in Canada, Europe and the Soviet Union, with another 10 being planned; 21 in the developed countries of the Far East in operation or being planned. Most of the world's metropolises have avoided the spread-out congestion that U.S. urban areas are now trying to overcome. The European cities devastated in World War II chose to rebuild compactly, with urban rail as a basic transportation element.

The following are profiles of several American metropolitan areas that chose rail transit in recent years, either new systems or extensions. In all cases, they chose with care--looking 20-30 years ahead, recognizing that rail transit would not replace the automobile for a large number of trips but that it could:

-- carry much of the expected increase in trips in already congested corridors;

-- encourage both housing and nonresidential development to cluster near rail stops, reducing auto trips;

-- improve mobility of those who cannot drive; and

-- improve the environment where activities are clustered and trips are shared.

Rail transit also provides increased independence from the volatile oil market. Several of the new rail systems were conceived or confirmed in response to recent oil crises.

While metropolitan rail transit at present carries a relatively small percent of total trips in the U.S., it carries a large percent of rush period trips in congested corridors. There is neither space enough nor money to carry that traffic in automobiles. Transit ridership dropped precipitously after World War II as Americans became auto-mobile and suburban, but metropolitan growth has brought people back to public transit, particularly rail transit. About 10% more are using metropolitan rail transit than a decade ago.

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**The fact that rail transit is a long-term commitment is one of its greatest strengths. Investors can count on it when making their own long-term investments, and planners can count on it to help shape the region.**

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Urban rail transit is a large, long-term commitment, requiring continued and increased support from all levels of government. It deserves that support because the American economy is increasingly centered in metropolitan areas, increasingly faces tough world competition, and must attract and accommodate business people from all over the world who expect modern cities to be like their own, compact with an ease of mobility available only through high-quality, regional public transit systems.

In short:

1. Large metropolitan areas are getting larger;

2. Efficient interaction in large metropolitan areas requires region-wide public transit services as part of a balanced, transportation network;

3. The efficiency and attraction of public transit are greatly enhanced when there are compact centers of activity and residential density related to the centers; and

4. Rail transit is an effective tool to achieve greater efficiency of regional transportation systems because it encourages development to relate to the transit and it attracts riders--people like rail.

World events are moving fast. The U.S. must move faster toward making the places where its economy is centered and where most Americans live into more efficient, attractive communities. Rail transit is essential in this cause.

## II

# A RENAISSANCE FOR RAIL TRANSIT

Street car and subway lines shaped most of America's cities for a century. By 1970, however, nearly every American city had abandoned its street cars, and only 10 urban regions had rail transit service: San Francisco, New York, Boston, Philadelphia, Cleveland, Chicago, Pittsburgh, Detroit, New Orleans and Baltimore-Washington.

### Recent Rail Construction

In the last 20 years, 13 new systems have been built: rapid transit in San Francisco, Washington, D.C., Atlanta, Baltimore, Miami and South Jersey; light rail in Buffalo, Los Angeles, Pittsburgh, Portland, Sacramento, San Diego, and San Jose. The number of rapid transit and light rail systems have more than doubled and their mileage has increased by 58% in just 20 years.

In addition, all the pre-1970 rail transit systems have been modernized and/or expanded.

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**The rail transit renaissance in the U.S. has gained momentum steadily in the past decade.**

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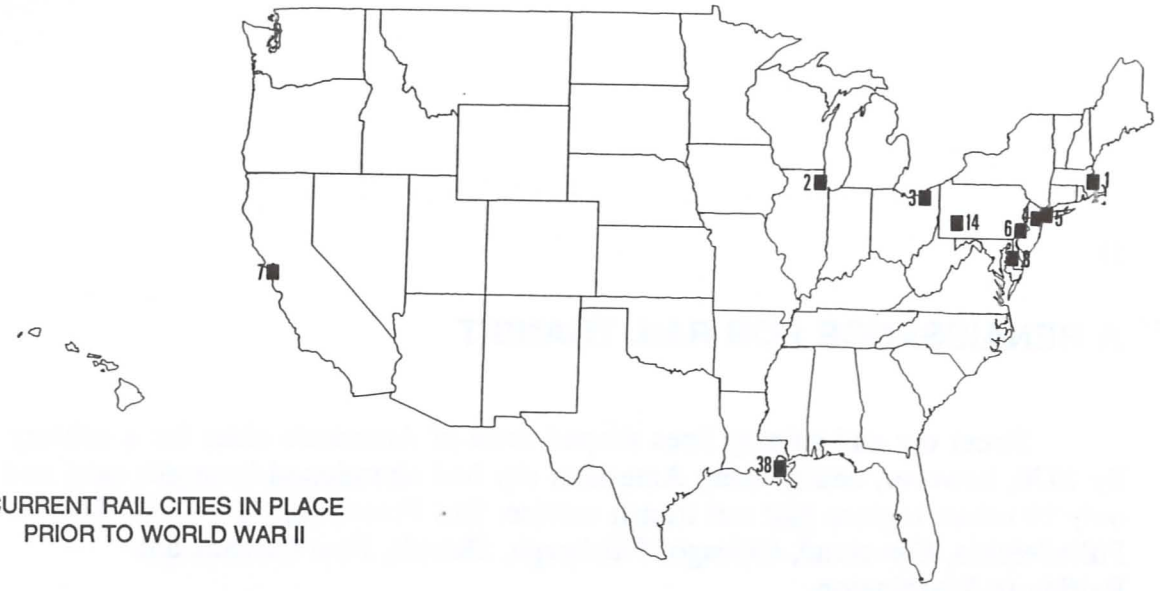
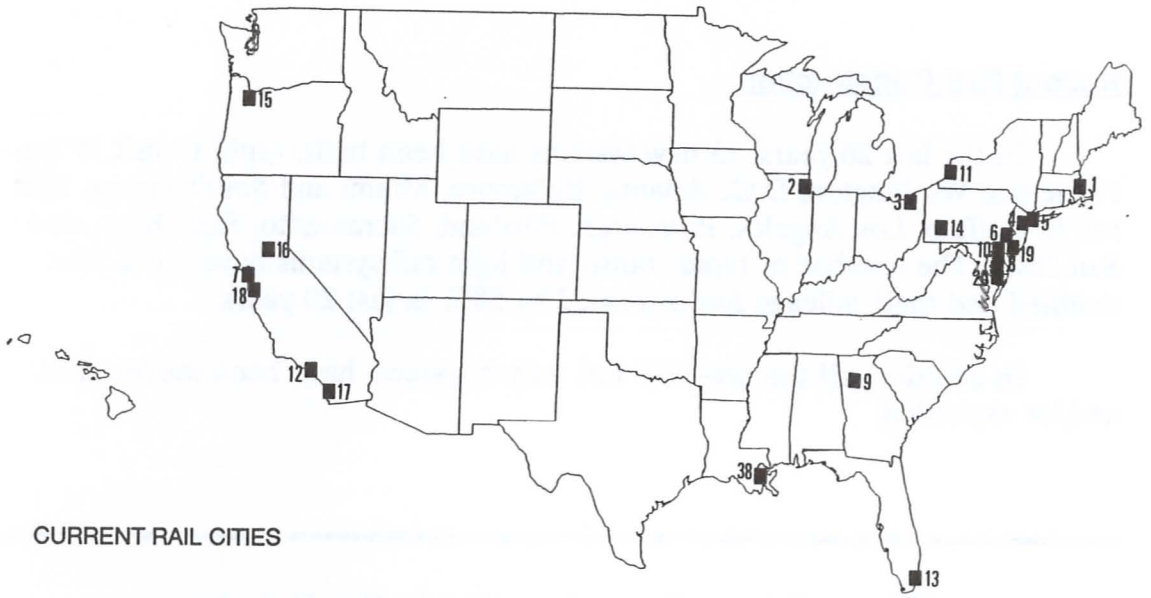
The rail transit renaissance in the U.S. has gained momentum steadily in the past decade. Since 1980, over 250 total system miles of rail transit have been built. On a typical day, rail transit in America now carries over 10 million passengers an average of 65 million miles.

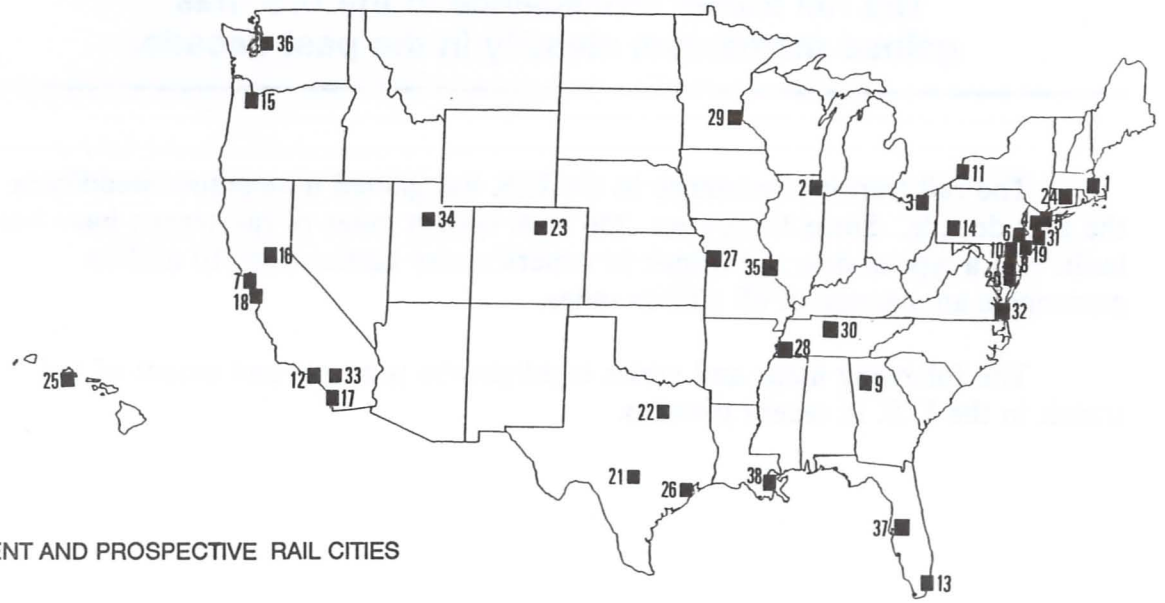
The following maps and tables highlight the progress and extent of rail transit in the U.S. in recent decades.




CURRENT RAIL CITIES IN PLACE
PRIOR TO WORLD WAR II




CURRENT RAIL CITIES




CURRENT AND PROSPECTIVE RAIL CITIES

## Number Key to Map of United States Rail Cities

| Current Rail Cities in Place Prior to World War II | | Added Since World War II | |
|---|---|---|---|
| | **Rapid Transit** | | |
| 1 | Boston | 9 | Atlanta |
| 2 | Chicago | 10 | Baltimore |
| 5 | NY Region - 3 systems | 3 | Cleveland |
| 6 | Philadelphia | 13 | Miami |
| | | 19 | South Jersey |
| | | 7 | San Francisco |
| | | 20 | Washington |
| | **Light Rail** | | |
| 1 | Boston | 11 | Buffalo |
| 3 | Cleveland | 12 | Los Angeles |
| 4 | Newark | 15 | Portland, OR |
| 14 | Pittsburgh * | 16 | Sacramento |
| 7 | San Francisco * | 17 | San Diego |
| 38 | New Orleans | 18 | San Jose |
| | **Commuter Rail** | | |
| 1 | Boston | 13 | Miami |
| 2 | Chicago | 12 | Los Angeles |
| 5 | New York Region - 3 systems | | |
| 6 | Philadelphia | | |
| 7 | San Francisco | | |
| 8 | Washington-Baltimore | | |

**Prospective Additional Systems**

| | | | |
|---|---|---|---|
| 21 | Austin | 4 | Newark (airport link) |
| 22 | Dallas | 31 | New Jersey Waterfront |
| 23 | Denver | 32 | Norfolk |
| 24 | Hartford | 33 | Orange County, CA |
| 25 | Houston | 34 | Salt Lake City |
| 26 | Kansas City, MO | 35 | St. Louis |
| 12 | Los Angeles (rapid transit) | 17 | San Diego (commuter rail) |
| 28 | Memphis | 36 | Seattle |
| 29 | Minn.-St. Paul | 37 | Tampa |

*Upgraded from streetcar to provide some separate right-of-way.

## Urban Rail Transit Cities in the United States

**Rapid Transit and Light Rail, through 1990**

| | Opened | Mode(s) | System Extent (miles) | Annual Passengers | Daily Passengers |
|---|---|---|---|---|---|
| Pre-1940 | | | | | |
| New York-North Jersey | 1867 | R,L | 280 | 1,773,000,000 | 5,800,000 |
| Chicago | 1892 | R,L | 108 | 169,000,000 | 550,000 |
| Boston | 1897 | R,L | 78 | 178,000,000 | 580,000 |
| Philadelphia - South Jersey | 1905 | R,L | 72 | 152,000,000 | 500,000 |
| Cleveland | 1920 | R,L | 32 | 13,000,000 | 45,000 |
| New Orleans | 1923 | L | 15 | 8,000,000 | 26,000 |
| | | | | | |
| **Subtotal Pre-1940** | | | 585 | 2,293,000,000 | 7,501,000 |
| | | | | | |
| 1940-1979 | | | | | |
| San Francisco | 1972 | R,L | 205 | 103,000,000 | 335,000 |
| Washington | 1976 | R | 70 | 183,000,000 | 600,000 |
| Atlanta | 1979 | R | 32 | 66,000,000 | 215,000 |
| | | | | | |
| **Subtotal 1940-1979** | | | 306 | 352,000,000 | 1,150,000 |
| | | | | | |
| 1980 to Present | | | | | |
| San Diego | 1981 | L | 22 | 11,000,000 | 36,000 |
| Baltimore | 1983 | R | 14 | 14,000,000 | 46,000 |
| Miami | 1984 | R | 21 | 15,000,000 | 49,000 |
| Buffalo | 1985 | L | 6 | 8,000,000 | 26,000 |
| Pittsburgh * | 1985 | L | 22 | 9,000,000 | 30,000 |
| Portland | 1986 | L | 15 | 7,000,000 | 23,000 |
| San Jose | 1987 | L | 9 | 3,000,000 | 10,000 |
| Sacramento | 1987 | L | 18 | 14,000,000 | 13,000 |

| | Opened | Mode(s) | System Extent (miles) | Annual Passengers | Daily Passengers |
|---|---|---|---|---|---|
| LA/Long Beach | 1990 | L | 21 | 7,000,000 | 23,000 |
| **Subtotal 1980 to Present** | | | 148 | 88,000,000 | 256,000 |
| | | | | | |
| **Grand Total** | | | | | |
| Number of US Rail Transit Cities | 18 | | | | |
| Totals | | | | | |
| | | | 1,039 | 2,733,000,000 | 8,907,000 |

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Note: New York City - North Jersey has four systems:

NYCTA - Rapid Transit
PATCH - Rapid Transit
SIRTOA - Rapid Transit
Newark City Subway (NJ Transit) - Light Rail

Philadelphia - South Jersey has three systems:

SEPTA - Rapid Transit
SEPTA - Light Rail
PATCO - Rapid Transit

Cleveland has two systems:

GCRTA - Rapid Transit
GCRTA - Light Rail

San Francisco has two systems:

BART - Rapid Transit
MUNI - Light Rail

Streetcars operating primarily on city streets are not included in Light Rail.
Excludes Commuter Railroads

Notes: R - Rapid Transit, L - Light Rail
* - Year upgraded Light Rail system opened

## Urban Rail Transit Cities in the United States

Commuter Rail through 1990

| | Number of Systems | System Extent (miles) | Annual Passengers | Daily Passengers |
|---|---|---|---|---|
| New York | 3 | 983 | 202,070,000 | 667,000 |
| Chicago | 4 | 439 | 71,000,000 | 234,000 |
| Boston | 1 | 258 | 18,600,000 | 61,000 |
| Philadelphia | 1 | 259 | 26,800,000 | 88,000 |
| Washington - Baltimore | 1 | 126 | 2,700,000 | 10,000 |
| San Francisco | 1 | 47 | 5,639,000 | 19,000 |
| Miami | 1 | 64 | 900,000 | 3,000 |
| Los Angeles | 1 | * | * | * |
| **Grand Total** | | | | |
| Totals | 13 systems | 2,176 | 327,700,000 | 1,082,000 |
| | 8 areas | | | |

Source: Chris Bushelle, Ed., *Jane's Urban Transport Systems 1990*.
* Not yet started when book was published.

### Another Burst of Construction Coming

The recent achievements of urban rail are leading to another burst of rail construction. Most systems in operation are planning expansion with strong public support. In addition, 14 urban areas currently without rail are in various stages--studying, preparing for, or constructing--despite the decline of federal financial participation in the 1980s. Voters in several places recently approved taxes for rail (including California, Austin, Minneapolis-St. Paul, San Francisco, Los Angeles, Orange County, CA, Sacramento, Dallas, and Houston), and states, cities and suburban governments have appropriated substantial funds (including Maryland, Honolulu, Houston, Minneapolis-St. Paul, and Atlanta).

Orange County, CA, is exploring rail to major hubs. Santa Ana Mayor Daniel H. Young: "It's an idea whose time has come. If we don't do something like this soon, we're all going to face miserable times with gridlock down the road."

"Rapid rail...with only 0.5 percent of [urban mass transportation] route miles, is responsible for 29 percent of passenger boardings. This indicates the high service intensity that rail can provide in certain settings."

U.S. Department of Transportation "National Transportation Strategic Planning Study," March 1990.

## Rail Transit Around the World

Adding rail transit to America's metropolitan transportation system will begin to enhance mobility and bring our travel more in line with the rest of the developed world. Now, U.S. public transportation use--bus and rail combined--is far behind.

## Passenger Trips Per Person on Public Transit (1980)

| | | | |
|---|---|---|---|
| 1. Moscow | 678.2 | 17. Toronto | 177.6 |
| 2. Tokyo | 471.8 | 18. Sydney | 142.3 |
| 3. Hong Kong | 466.3 | 19. NEW YORK | 121.5 |
| 4. West Berlin | 394.5 | 20. S.FRANCISCO | 115.0 |
| 5. Zurich | 363.3 | 21. CHICAGO | 114.6 |
| 6. Singapore | 353.1 | 22. Melbourne | 94.8 |
| 7. Amsterdam | 345.4 | 23. WASH., D.C, | 91.2 |
| 8. Vienna | 312.9 | 24. Adelaide | 83.2 |
| 9. Munich | 306.9 | 25. BOSTON | 79.9 |
| 10. Frankfurt | 306.3 | 26. Brisbane | 79.3 |
| 11. Stockholm | 302.3 | 27. Perth | 70.8 |
| 12. London | 284.4 | 28. LOS ANGELES | 59.2 |
| 13. Brussels | 265.8 | 29. DENVER | 26.9 |
| 14. Paris | 259.1 | 30. DETROIT | 25.7 |
| 15. Hamburg | 248.3 | 31. HOUSTON | 14.7 |
| 16. Copenhagen | 200.9 | 32. PHOENIX | 9.1 |

Source: Jeffrey R. Kenworthy and Peter W.G. Newman study of 32 cities, July, 1987.

Countries competitive with the U.S. are ahead of us in part because of the availability of rail transit. Nearly all large industrial countries, as well as developing countries, have postwar rail transit systems. Most of those countries are building more rail transit. The following table highlights rail transit development, worldwide.

One of the few European cities that tried to develop the American way, with highways, has changed its approach. *The New York Times* quoted the Chairman of Birmingham, England's City Council Economic Development Committee: "We've taken a decision to drop the roads. In the early 1950s, people thought Birmingham was in the vanguard for designing the city for easy automobile access. But thinking has changed."

For example, Tokyo has been adding rail lines regularly since 1950 and is in a 10-year metropolitan development plan, 1986-1995, calling for 28 miles of new magnetic levitation subway line costing nearly $6 billion and other public transit investment of another $1 billion. Commuter railroads also are being extended.

London's rapid transit system has had a sharp increase in riders in the 1980s: 35% rise in peak-hour travel, 80% rise in off-peak, with passengers increasing by 2-3% a year. Commuter rail travel also has risen 3% a year for the past five years and is making an operating profit. There is a decline in auto traffic into inner London despite a rapid rise in car ownership and traffic generally in the metropolitan area.

**London has built a light rail line to Docklands, the new business area. The line is now being extended and its stations enlarged to increase capacity due to much heavier passenger volumes than initially projected.**

Annual capital investment in London's Underground has been increasing to well over $1 billion in the last five years of the 1980s, with plans to raise that further in the next few years. Commuter rail service also received well over $1 billion in investment in the late 1980s with substantially more scheduled for the early 1990s.

Inter-city rail service in Europe will be improved with investment of about $65 billion during the years 1985-2005.

## International Rail Transit Cities
### as of 1990

| | Year Opened | Mode(s) | System Extent (miles) | Annual Passengers (millions) |
|---|---|---|---|---|
| Pre-1940 | | | | |
| Glasgow | 1897 | R | 6 | 14 |
| Paris | 1900 | R | 342 | 1,552 |
| Berlin | 1902 | R | 128 | 459 |
| Hamburg | 1912 | R | 126 | 314 |
| Madrid | 1919 | R | 70 | 354 |
| Barcelona | 1924 | R | 44 | 265 |
| Athens | 1925 | R | 16 | 97 |
| Tokyo | 1927 | R | 136 | 2,541 |
| Osaka | 1933 | R | 65 | 954 |
| Moscow | 1935 | R | 1,294 | 2,602 |
| London | 1863 | R, L | 261 | 822 |
| Budapest | 1896 | R, L | 113 | 826 |
| Vienna | 1898 | R, L | 24 | 221 |
| Hong Kong | 1910 | R, L | 62 | 838 |
| Buenos Aires | 1913 | R, L | 28 | 224 |
| **Subtotal Pre-1940** | | | 2,717 | 12,083 |
| | | | | |
| **1940-1979** | | | | |
| Stuttgart | 1966 | L | 120 | na |
| Cologne | 1968 | L | 48 | na |
| Antwerp | 1975 | L | 21 | na |
| Hannover | 1975 | L | 16 | na |
| Essen | 1977 | L | 7 | 2 |
| Edmonton | 1978 | L | 7 | 2 |

| | Year Opened | Mode(s) | System Extent (miles) | Annual Passengers (millions) |
|---|---|---|---|---|
| Stockholm | 1950 | R | 65 | 240 |
| Toronto | 1954 | R | 34 | 72 |
| Leningrad | 1955 | R | 52 | 821 |
| Rome | 1956 | R | 16 | 162 |
| Lisbon | 1959 | R | 10 | 140 |
| Kiev | 1960 | R | 21 | 369 |
| Milan | 1964 | R | 24 | 270 |
| Tbilisi | 1966 | R | 14 | 145 |
| Montreal | 1966 | R | 40 | 65 |
| Oslo | 1966 | R | 30 | 36 |
| Baku | 1967 | R | 18 | 146 |
| Frankfurt | 1968 | R | 26 | 66 |
| Rotterdam | 1968 | R | 32 | 50 |
| Mexico City | 1969 | R | 88 | 1,476 |
| Munich | 1971 | R | 291 | 417 |
| Sapporo | 1971 | R | 25 | 202 |
| Beijing | 1971 | R | 25 | 160 |
| Yokohama | 1972 | R | 14 | 87 |
| Nuremburg | 1972 | R | 13 | 50 |
| Sao Paulo | 1974 | R | 25 | 565 |
| Kharkov | 1974 | R | 14 | 234 |
| Seoul | 1974 | R | 73 | 810 |
| Prague | 1974 | R | 22 | 446 |
| Santiago | 1975 | R | 17 | 133 |
| Pyongyang | 1975 | R | 14 | 42 |
| Brussels | 1976 | R | 24 | 52 |
| Tashkent | 1977 | R | 15 | 119 |
| Kobe | 1977 | R | 14 | 58 |
| Amsterdam | 1977 | R | 15 | 37 |

| | Year Opened | Mode(s) | System Extent (miles) | Annual Passengers (millions) |
|---|---|---|---|---|
| Marseille | 1977 | R | 11 | 57 |
| Lyon | 1978 | R | 9 | 63 |
| Bucharest | 1979 | R | 29 | 226 |
| Nagoya | 1957 | R, L | 42 | 338 |
| Bochum | 1978 | R, L | 64 | na |
| Rio de Janeiro | 1979 | R, L | 14 | 96 |
| **Subtotal 1935-1979**** | | | 1,457 | 8,259 |
| | | | | |
| **1980 to Present** | | | | |
| Calgary | 1981 | L | 17 | 11 |
| Dusseldorf | 1981 | L | 34 | na |
| Manila | 1984 | L | 9 | 102 |
| Tunis | 1985 | L | 12 | 22 |
| Bilboa | 1989 | L | 4 | na |
| Tianjen | 1980 | R | 5 | 9 |
| Newcastle | 1980 | R | 9 | 6 |
| Fukkouka | 1981 | R | 5 | 84 |
| Erevan | 1981 | R | 10 | 24 |
| Heisinki | 1982 | R | 16 | 36 |
| Lille | 1983 | R | 25 | 29 |
| Caracas | 1983 | R | 6 | 280 |
| Minsk | 1984 | R | 6 | na |
| Calcutta | 1984 | R | 6 | 19 |
| Gorki | 1985 | R | 6 | 66 |
| Pusan | 1985 | R | 13 | 100 |
| Novobibirsk | 1985 | R | 5 | na |
| Belo Horizonte | 1986 | R | 12 | 10 |
| Vancouver | 1986 | R | 14 | 23 |
| Singapore | 1987 | R | 33 | 138 |

| | Year Opened | Mode(s) | System Extent (miles) | Annual Passengers (millions) |
|---|---|---|---|---|
| Kuibyshev | 1987 | R | 8 | na |
| Sendai | 1987 | R | 9 | 44 |
| Cairo | 1989 | R | na | 146 |
| Kyoto | 1981 | R, L | 29 | 94 |
| **Subtotal 1980 to Present**** | | | 332 | 1,243 |
| | | | | |
| **Grand Total** | | | | |
| Number of International Transit Cities | 80 | | | |
| **Totals**** | | | 7,039 | 21,585 |

Note: ** - Including only those systems in which both line miles and annual passengers were available.

Source: Chris Bushelle, Ed.,
*Jane's Urban Transport Systems, 1990.*

## Policies That Support Rail Transit

Around the world, public transit ridership is higher than in the U.S. for four reasons: (1) land-use policies; (2) cost of driving; (3) national infrastructure finance policies; and, (4) local government structure.

1. Land Use Policies

   European countries and Japan consciously have chosen to keep urban development compact, making a clear separation of city and countryside. In the U.S., urban development keeps spreading haphazardly and at lower and lower density; jobs and services are scattered rather than clustered in urban centers. This makes riding together very difficult.

2. The Cost of Driving

   A recent study published in the American Planning Association Journal found that the share of trips made on public transit around the world depends on the cost of driving. So, in most of the world, transit ridership is far higher than in the U.S. because the cost of driving is far more expensive, primarily due to much higher taxes on the motorist. The gasoline tax is only one example:

   Gasoline Tax per Gallon (1st quarter, 1980)

| | |
|---|---|
| Italy | $ 3.31 |
| Japan | 1.41 |
| France | 2.62 |
| United Kingdom | 1.66 |
| Germany | 1.80 |
| Canada | .78 |
| United States | .31 |

Source: New York Times, September 24, 1990

3. Infrastructure Investment Policies

   Other developed nations are spending more than the U.S. on public infrastructure, including public transit. Recent U.S. studies show that this investment promotes increased private sector productivity.

4. Regional Planning and Development

Governments above the local level have organized regional public transit. In many U.S. metropolitan areas, fragmentation of local government adds an additional barrier to establishing a public transit system and relating it to land use.

"...differences in travel behavior are largely due to differences in public policies." John Pucher, Rutgers University, APA Journal, Winter, 1990.

Despite a less supportive policy environment in the United States, a rail transit renaissance is underway.

## III

## WHO CHOSE RAIL? WHY? WITH WHAT RESULTS?

This rail renaissance surprised many. There had been some who believed after World War II that the auto could provide all the transportation Americans would ever need. Jobs, services and housing would spread out enough to avoid congestion.

While the suburbs have indeed captured the largest share of postwar urban growth, cities, central places, and major activity centers didn't die. Their function of bringing people together has remained important through the electronics revolution and the economic evolution from manufacturing to services.

Indeed, the postwar decentralization is not as remarkable as the perseverance of cities. In 1945, demand for homes and cars had been pent-up during 15 years of depression and war. Suddenly in the late 1940s, people could buy housing and cars while cities were crowded and worn out from lack of investment. Vacant land around the cities could quickly accommodate the growth. The newly ubiquitous automobile made growth feasible, on highways built as depression pump-priming investments. Low-density suburban development was further encouraged by national tax benefits for single-family home-owners, benefits not available to apartment renters. Suburbanites also were spared many of the extra costs of public services to low-density areas.

Later, many households left city homes, fleeing the crowding in of poorly-educated rural and foreign farmhands forced out of agriculture by mechanization. So cities came to be seen as the home of the poor and minorities.

Still, cities retain a strong business function. They captured a quarter of all metropolitan job growth between 1950 and 1986. Altogether, 33 rail transit or potential rail cities have nearly half of the headquarters of the nation's largest 1,000 corporations. The eight cities that have had rail rapid transit since 1980 have 230 headquarters of the nation's largest 500 industrial and 500 service corporations.

A recent office survey by Cushman and Wakefield shows that, on the whole, central business districts (CBDs) have lower vacancy rates than their suburbs, even with generally higher rents. The differences were more striking in CBDs served by rail than in other CBDs.

## Office Vacancy Rates, 1990

| METROPOLITAN AREA | CBD VACANCY % | SUBURBAN VACANCY % | RENTS<br>+ : CBD higher<br>- : CBD lower<br>= : about same |
|---|---|---|---|
| Atlanta | 15.2 | 20.3 | = |
| Boston | 14.2 | 20.4 | + |
| Chicago | 14.2 | 21.8 | + |
| Los Angeles | 15.7 | 14.2, 18.2, 18.4, 25.5 | + |
| Miami | 24.2 | 20.2 | + |
| New York City | 16.2 & 18.5 | 12.4, 17.6, 19.2, 20.0 | + |
| Oakland | 15.2 | 16.5 | + |
| Philadelphia | 11.2 | 20.5 | + |
| Pittsburgh | 17.2 | 17.5 | + |
| Portland | 15.4 | 16.4 | + |
| San Francisco | 11.9 | 13.3, 20.4* | + =* |
| Washington, D.C. | 8.9 | 17.1 & 17.7 | + |
| Cities Without Rail | | | |
| Dallas | 28.5 | 26.7 | + |
| Denver | 23.0 | 25.3 | = |
| Detroit | 14.4 | 20.5 | = |
| Hartford | 15.3 | 20.1 | + |
| Houston | 24.3 | 28.1 | + |
| Phoenix | 29.3 | 28.0 | = |
| San Antonio | 29.2 | 28.5 | = |

* S.F. Peninsula

Rail-served downtowns have lower vacancy rates than downtowns not served by rail and have a greater spread between downtown and non-downtown vacancy rates, on the whole, than non-rail cities.

Source: Cushman & Wakefield, "Across the Nation," Second Quarter, 1990.

"Brokers said urban centers like Newark where mass transit is available are expected to do well."

*New York Times*, December 30, 1990.

Indeed, cities are assuming new importance.

-- The world environment requires a reduction in the use of fossil fuels, and cities conserve energy.

-- America is embarking on a new wave of immigration, and cities are where most immigrants will find housing and friends and relatives from their home country. Keeping jobs within their reach is important for them and for the economy.

-- The poor and minorities are increasingly isolated in many cities, exacerbating growing divisions among racial and ethnic groups. Cities must be made attractive to people who can afford to choose city or 2suburb.

-- The global economy requires more face-to-face communication among a large and complex network of participants, and cities facilitate interpersonal contact.

"...cities that have high densities, a strong center, and relatively good transit systems use much less energy in transportation."

Alan Black, University of Kansas
APA Journal, Winter, 1990.

And there are a number of reasons why cities need rail:

-- Even in the suburbs, the cost of traffic congestion is becoming prohibitive, driving out business. In the 1980s, auto registration increased twice as fast as population, and vehicle-miles travelled increased twice as fast as auto registration.

-- More than half of all Americans live in areas that have too much ground-level ozone, and a third live in areas with unhealthy carbon monoxide. Transportation causes most of this pollution with the primary contributor being the auto.

-- The number of older people agile enough to travel but too old to drive easily is increasing rapidly. They will need public transit and walkable neighborhoods.

-- Similarly, equal access for persons with disabilities, now high on America's agenda, requires public transit.

**Pollution Emitted from Typical Work Commutes, United States***

| Mode | Hydrocarbons | Carbon Monoxide | Nitrogen Oxides |
|---|---|---|---|
| | (grams per 100 passenger-kilometers) | | |
| Rapid rail | 0.2 | 1 | 30 |
| Light rail | 0.2 | 2 | 43 |
| Transit bus | 12 | 189 | 95 |
| Van pool | 22 | 150 | 24 |
| Car pool | 43 | 311 | 43 |
| Auto** | 130 | 934 | 128 |

*Based on national average vehicle occupancy rates.
**Based on one occupant per vehicle.

Source: American Public Transit Association

-- Rail transit attracts many passengers who do not ride buses because it offers a higher level of service and stronger image.

-- There is growing interest in places that foster a sense of community, whether downtown or at home--pleasant places for serendipitous meetings. In Europe, cities are using "traffic calming" techniques that slow cars and add pedestrian, cycling and play space. Auto-free downtown areas are common in European cities. But inhibiting the auto should mean providing a good public transit alternative.

So the rail renaissance in the U.S. is not all that surprising. It is even more easily understood when seen from the perspective of the individual metropolitan areas that recently chose to build urban rail transit.

"Good transit systems like BART, MAX and METRORAIL have done much more for their cities than provide fast modern transport."

Peter W. G. Newman
Jeffrey R. Kenworthy
Murdoch University
Perth, Western Australia
APA Journal, Winter, 1990.

## Rail Transit Experiences

The experiences highlighted on the following pages are based on information provided by local officials. The examples chosen illustrate the range of circumstances, goals and experiences associated with recent rail transit development. Examples from other cities and systems would reinforce these experiences.

## IV

## PROFILES: NINE NORTH AMERICAN RAIL TRANSIT SYSTEMS DEVELOPED SINCE WORLD WAR II

- Atlanta
- Baltimore
- Buffalo
- Portland
- San Diego
- San Francisco
- South Jersey
- Toronto
- Washington, D.C.

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**The ultimate value of rail transit, however, is best illustrated by a sentiment common to all rail transit cities--a dedication to further expand rail transit services in every case where rail transit is now in operation.**

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# ATLANTA

## Description

In the Atlanta region, the Metropolitan Atlanta Rapid Transit Authority (MARTA) operates 32.1 miles of rail rapid transit; 12.3 miles are under construction or design and another 16.1 miles contemplated.

The first service began in 1979 on about 12 miles, with 20 added in six segments over the next decade.

The system is focused on the center of Atlanta but also serves the airport and jobs in two suburban corridors. Large parking lots at peripheral stations serve commuters from counties farther out.

## Who Chose Rail and Who Pays?

Rail was proposed by the Atlanta Region Metropolitan Planning Commission to accommodate projected growth as early as 1954. An Atlanta Area Transportation Study Policy Committee then recommended rail in a report aimed at "balanced, long range" regional transportation.

After the transit authority board voted for a rail rapid transit system, referenda to allocate a 1% sales tax to finance public transit were held in four counties in 1971. Voters approved it in Fulton and DeKalb, two of the four counties. The 1% sales tax providing both rail and bus subsidy was extended for 42 years in 1990 by the two counties served by the Authority.

Federal grants were awarded in 1973, 1974, 1975, 1977 and 1989, under four Administrations. The federal share of funding for MARTA rail, initially 80%, most recently has fallen to 50%. Atlanta values its system so highly, however, that expansion is continuing.

## Goals

Choosing rail, Atlanta aimed at:

-- Job growth by creating an image of a modern city,

-- reducing traffic congestion and attendant air pollution at a lower cost than added highway capacity.

But rail was part of a larger vision of the region. The vision included a strong downtown, compact development which would save 82,000 acres of countryside from development, neighborhoods without highway barriers, and a diversity of neighborhoods--some highly urban, some undisturbed suburban.

Long-term, Atlanta wants an enlarged rail-connected region covering southeast Georgia, connecting Atlanta to Rome, Gainesville, Athens, Macon, Columbus, Savannah and other cities.

## Transportation Results

In the first nine years after rail service began in 1979, total passenger miles ridden on buses and rail went up by 58% compared to 33% in the previous nine years. The 33% pre-rail rise was fueled by a fare cut from 40¢ to 15¢ and significant service improvement in 1972, all part of the sales tax referendum agreement. Transit use has continued to increase despite fare increases that brought the fare to $1.00. (July 1, 1990)

Rail has reduced operating costs compared to buses--
per passenger (75¢ vs $1.19) and per passenger mile (17¢ vs 36¢).

Since rail started, the percentage of operating costs obtained from fares has risen from 20.1% in 1978 to 34.4% in fiscal year 1990.

Rail is faster, averaging 24 mph vs 13 mph, and rail speeds are rising, while bus speed remains about the same.

As to keeping auto congestion down, for four years, 1982-86, miles ridden on transit increased almost as fast as auto miles travelled on freeways and major arterial roads, 35% vs. 42%. Fares finally had to be raised on the system, reducing transit travel while auto travel continued upward. Those four years show that transit can attract riders if fares don't leap ahead while driving costs remain the same.

"...The success of Atlanta...goes back to 1971 when the city fathers, public and private sector, got together and determined that mass transportation was essential for the future development of this area."

Former Mayor Andrew Young

"Nothing has been more responsible for growth and development in Atlanta than our Metropolitan Atlanta Rapid Transit Authority."

Former Atlanta Mayor Andrew Young
Phoenix Gazette, January 20, 1989.

## Other Benefits

Rail was built in anticipation of growth, and population has more than quadrupled in two decades. Just as importantly, the rail system has been built in response to land-use plans, and development has followed. Over $70 billion of new private investment has been located around rail stations, and that investment has stimulated ridership--most notably, "Underground Atlanta," a downtown retail and entertainment center. The station across the street has had a 45% rise in riders on weekdays and 225% on weekends since Underground opened in June 1989.

At another station seven miles northeast of the system's center, two high-rise office buildings will be connected to the station with plans for a third tower and a hotel.

**Over $70 billion of new private investment has been located around rail stations, and that investment has stimulated ridership.**

In anticipation of the opening of the North line extension, there are plans for 3.6 million square feet of office space at the Buckhead station and a tunnel connection to the station from another large office development.

Several downtown buildings were built in conjunction with the new stations and connected to them. The Omni, home of the City's basketball and hockey teams, is connected to a rail station.

Twice as many Atlanta region business leaders interviewed by the Texas Transportation Institute called for extending rail as favored adding freeway capacity (60% vs. 30%).

Interviews by the Institute of representatives not only of business but of transportation and planning agencies, downtown and other development organizations, visitors bureaus, and city officials found:

-- Those who use rail are very pleased, and the City is proud of it.

-- Downtown and suburban shopping centers, higher educational institutions, the Arts Center area and sports centers are more accessible. Downtown is more attractive.

-- Rail improves mobility of those who cannot drive.

-- Foreign businesses assume that cities should have good public transportation and large cities should have rail--so rail has helped attract foreign investment.

-- Service to the airport, which has attracted more riders than expected, is especially helpful in promoting the region. It cuts rush-hour travel time to downtown from an hour to 15 minutes.

-- While some interviewees were disappointed that development did not follow the opening of some rail stations, they recognized that rail is a long-term investment and eventually expected development to follow.

Atlanta has used its rail transit system to promote large-scale activities that could not function well without rail. Regional leaders doubt they would have been chosen to host the 1984 Democratic convention or the 1996 Olympics without a rail transit system.

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**Twice as many Atlanta region business leaders interviewed by the Texas Transportation Institute called for extending rail as favored adding freeway capacity (60% vs. 30%).**

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# BALTIMORE

## Description

Baltimore's subway, Metro, is 14 miles long, running from northwestern Baltimore County to downtown, from high-income neighborhoods through middle-income and low-income neighborhoods. Of all households in the corridor, 38.5% had no car in 1980. Only half of those employed drove to work. Family income was two-thirds of the region's average and grew less than half as fast in the 1970s.

Eight miles opened in 1983, six more in 1987. A 1.5-mile extension to reach Johns Hopkins Hospital, the city's largest employer (11,000 employees), will open in 1994.

The 22.5-mile Central Light Rail Line (LRT) is expected to open in 1992, though questions about state funding remain. Three planned extensions will add five miles to the line. The Central Light Rail Line will run on an existing rail right-of-way, from Hunt Valley--a suburban business, residential and shopping hub with regional offices of several national corporations--through the city's cultural district, to the University of Baltimore, to a new downtown baseball stadium and Pennsylvania station, to the Baltimore-Washington International Airport, and to Glen Burnie in suburban Anne Arundel County.

**Rail has been part of the strategy to transform Baltimore's economy from manufacturing to a more broad-based economy capable of competing in the global marketplace.**

Light rail passengers may transfer to the Metro, buses or the state's commuter rail system, which connects Baltimore with Washington and Brunswick, MD.

When the trains are on their own right-of-way in outlying areas, speed is expected to be 50 mph; on downtown streets, 20 mph. Metro is working to get priority at traffic lights.

Honor system automatic ticketing with roving inspectors will be used.

## Who Chose Rail and Who Pays?

The federal government paid 80% of the initial rapid transit segment, the state 20%; for the added six miles and final 1.5-miles, the federal government is paying 85%, the state 15%, because all the federal funds are from Interstate Highway money turned in for transit.

For the light rail line, the state chose to speed the process and reduce preliminary costs by foregoing federal aid. The $446.3 million cost will be paid almost entirely by the state, with the two suburban counties and the city each contributing $10 million.

The second subway segment came in under budget. The light rail cost estimate rose by 40%, mostly due to unforeseen repairs on the right-of-way.

## Goals

Rail has been part of the strategy to transform Baltimore's economy from manufacturing to a more broad-based economy capable of competing in the global marketplace.

In addition to strengthening downtown Baltimore and supporting Harbor Place--shops, restaurants and an aquarium on the Inner Harbor near downtown--a major goal has been to improve opportunities for city residents to reach suburban jobs, important for both the employers' and employees' sake. Another goal is serving areas designated for growth by plans of surrounding counties.

The Maryland Department of Transportation projects that from 1985 to 2010, trips to work within Maryland will increase by almost half, from 4.6 to 6.9 million. To accommodate some of this increase, MDOT calls for extensions of rail transit service into both Baltimore and Washington suburbs.

## Transportation Results

Daily trips were projected to reach 35,000 after 20 years. First year daily trips averaged 35,000, and by mid-1986, they had reached 43,000, a 23% rise. By 1987, with an additional six miles adding 7,500 trips, the total had risen to 52,000.

A year after Metro service began, a regional planning agency study documented that vehicles entering the central business district in that corridor decreased 15% while traffic rose 7% in all the other corridors. Transit riders increased 42% in that corridor while decreasing 13% in other corridors. Vehicles crossing the city line in that corridor went down 1% from 1983 to 1985, while rising 12% in the other corridors.

In the suburbs, more employees began to use public transit--to one suburban mall, employee use rose from 17% to 30%. Shoppers also shifted to public transit. At one mall where the rail station is in the parking lot, shoppers using transit rose from 20% to 37%. At a second mall, where the station is a few blocks away, transit use went from 15% to 20%.

## Other Benefits

Downtown, two suburban malls, and downtown Owings Mills all have attracted new development and redevelopment as a result of the Metro. Three downtown office towers cluster around the Charles Center Metro station. Lexington Market has been redeveloped.

# BUFFALO

## Economic Setting

Buffalo's last 30 years offer a lesson in transportation planning: short-term cycles can be severe and hard to anticipate in the necessarily long-term development of a rail system. But cities have a basic function--to bring large numbers of people together--which eventually steadies the economy and justifies the long-term rail investment.

Re-establishing rail service, that had ended in 1950, had been discussed since the late 1960s, when Buffalo was a thriving city, producing and handling goods. But the St. Lawrence Waterway, which opened in 1959, bypassed the city, eliminating Buffalo's function as the main depot at the foot of the Great Lakes. By 1980, four years after the first line was approved and financed, economic hardship hit Buffalo with massive lay-offs in the heavy industry sector. The region's largest employer, Bethlehem Steel Corporation, employed only half its earlier work force of 19,000, and both General Motors and Ford had cut jobs. Unemployment hit 10%, up to 40% among inner-city black workers, four out of five of whom were under 25. In 1983, Bethlehem Steel laid-off another 7,300, and the unemployment level hit its peak.

Construction of Metro Rail began in 1979 at a time of deep recession for Western New York State. Much of the $535 million cost was spent in Western New York, providing a needed boost to the local economy. The economy was just beginning to recover in 1986 when rail service began. By then, the region's population was about 15% below a decade earlier.

By 1990, however, unemployment had dropped from 15% to 5%, and Canadian investors were interested in property around transit stations.

## Description

Buffalo currently enjoys the service of a modern light rail line built and operated by the Niagara Frontier Transportation Authority. The line connects a State University at the northern city limits with Buffalo Place, a 1.2-mile pedestrian and transit mall. The rest of the line is in a 5.2-mile tunnel under major streets, providing reliability during heavy snowfalls and inclement winter weather and allowing rail to speed beneath a congested roadway on which cars, even in the 1970s, were travelling at less than 15 mph and buses at about 10 mph.

Riding is free on the downtown mall, allowing Metro Rail to perform successfully as a downtown "people mover."

The Authority is involved in two planning projects that could result in future expansion of Metro Rail. An economic development/value capture study is reviewing the proposed Amherst Corridor line to determine if the increase in property value and economic benefits along the proposed extension could be tapped to help defray costs. The added line would link two major university campuses as well as provide direct service between downtown Buffalo and Amherst, western New York's most populous suburban community.

The second evaluation is a feasibility study for the Tonawandas Corridor, examining alternative modes, including railbus, rehabilitated street cars, and conventional light rail for a line which would use an abandoned railroad right-of-way already owned by the Authority.

## Goals

A major goal of rail service was to revitalize downtown Buffalo and stimulate the regional economy. In addition, the rail system was intended to:

-- improve access to opportunities for neighborhoods through which it runs. Some of these neighborhoods have high unemployment and low auto ownership, others have many elderly persons;

-- provide travel benefits to existing transit users;

-- draw the varied populations to meet along the route;

-- promote energy savings;

-- improve air quality;

-- improve the downtown environment by reducing auto entries and parking space; and,

-- discourage strip commercial development along the route and encourage development of clusters of activities around rail stations.

Primarily, rail was part of the strategy to restructure the region's economy and generate jobs.

## Who Chose Rail and Who Pays?

Planning and design of the Metro Rail project achieved consensus from all levels of local and state government and all elements of the community. The project was funded by federal and state grants. However, no local dedicated source of operating assistance existed. The lack of a local dedicated source of revenue along with declining federal operating assistance eventually led to a financial crisis during which the transportation authority was forced to shut down transit service on April 1 and 2, 1990. A number of proposed sources of local funds, including a utilities tax, were debated by the Erie County Legislature over the two-year period before the shutdown. The shutdown led to a negotiated approval of a local dedicated source of funding from a combination of sales tax and real estate property transfer payments.

During the transit shutdown, police estimated an additional 25,000 cars on the road.

In an interview following the two-day rail shutdown, Glenn S. Hackett, member of the Transportation Authority Board of Commissioners, emphasized the importance of good public transit for those who cannot drive--children, elderly, poor--to allow low-income people to get to work.

At the same time, James Allan, executive director of the Amherst Industrial Development Agency and a key player in local economic development efforts, called public transportation a necessity and not a public luxury.

## Transportation Results

Metro rail currently carries about 29,000 riders on an average weekday. This accounts for almost 25% of the Transportation Authority's total system ridership. The rail system has been extremely successful in attracting off-peak, non-commuter ridership to downtown entertainment and special events.

Traffic congestion has been reduced on Main Street by the removal of the majority of buses from this major arterial.

Downtown parking policy now reflects the role of rail transit use through reductions in CBD parking requirements.

Metro rail significantly has reduced the transit travel time in the Main Street corridor. A trip from the city line to downtown that took up to 45 minutes by bus now can be made on rail in 22 minutes. The same trip by automobile has been measured at approximately 25 minutes.

Metro rail is completely and easily accessible to elderly and disabled riders, including those in wheelchairs, offering a dramatic improvement in their accessibility.

**Metro rail significantly has reduced the transit travel time in the Main Street corridor.**

## Other Benefits

Buffalo's new rail system has played a significant part in the metropolitan area's rapid transition from a fast-declining manufacturing and port economy to a low-unemployment service-oriented city benefiting from free trade with Canada.

In order to take full benefit of the mall and rail service, downtown property owners initiated and obtained State approval of a special assessment district into which they are paying about $1 million a year to maintain and promote the mall.

A great deal of new development has followed the agreement to provide rail service. It was built near the site of two new downtown office buildings. Immediately prior to initial service, Buffalo city planners estimated a commitment of $650 million in future private and public investment based on the rail investment.

"Construction projects totalling $300 million have been initiated or completed since the start of construction of our rail project in April, 1979."

"The private sector accounts for nearly 80% of this investment. A truly exciting aspect of this development is that it includes commercial, industrial and residential projects that help make downtown Buffalo an increasingly rewarding place to work, seek recreation and live....Development is also occurring adjacent to the rail stations outside the central business district under city guidelines that have been drawn to protect surrounding neighborhoods while realizing the best developments possible."

Raymond F. Gallagher, Chairman of the Niagara Frontier Transportation Authority, testifying before the U.S. Senate Appropriations Committee in 1986.

Altogether more than $900 million in development has been attracted to rail stops, including:

- four office buildings and a 400-room Hyatt Hotel adjacent to downtown Huron Station;
- a $2-3 million walkway connecting Main Place Shopping Mall with other buildings and developments;
- a $40 million Marine Midland Bank office center;
- numerous office building renovations;
- downtown residential units; and
- a 150-room Journey's End Hotel.

The opening of Buffalo Place, the transit mall, resulted in a midday peak on the rail line for lunch and shopping, since riding on the mall is free. Both ridership and retail sales have risen steadily since the completion of the transit mall in 1987.
Retail sales at downtown stores increased 8% (in 1988), an increase competitive with suburban locations. During the summer of 1989, five restaurants along the mall in the theater district opened sidewalk cafes. One of those restaurants has experienced a 25% increase in luncheon business since Metro Rail service began.

The transportation authority is an active participant in downtown events, including two major annual events, Taste of Buffalo and Allentown Art Festival, a weekend event which draws 40,000 to 50,000 riders on the rail system. Other events include the Christmas holiday season for both shopping and special events, concerts, and the New Year's Eve celebration. Attendance at cultural events increased due to Metro. The recently opened Market Arcade 8 Cinemas (total seating capacity is approximately 2,200) ranks in the top 25% of the General Cinemas chain. It is the first time the chain has made such an investment in a downtown. Attendance at all seven live theaters in the theater district has increased each year since Metro's opening. An estimated 20% of those attending these and other cultural events use public transit.

Rail specifically allows large-scale activities to occur without traffic congestion, like conventions and exhibits at the downtown convention center and sports events and concerts at the new downtown baseball stadium, Pilot Field, and at Memorial Auditorium. On baseball's opening day in 1988, over half those attending came by rail, and during the entire 1989 season, one in seven baseball fans took the train.

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**Buffalo's new rail system has played a significant part in the metropolitan area's rapid transition from a fast-declining manufacturing and port economy to a low-unemployment service-oriented city benefiting from free trade with Canada.**

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As a result of the 1989 U.S. - Canadian Free Trade Agreement, which phases out tariffs over ten years, Buffalo is fast becoming the U.S. site for Canadian businesses. Since the agreement, both Buffalo's City Hall and the Transportation Authority have received numerous inquiries from Canadian businesses requesting information about available office space adjacent to rail stations. Buffalo, the city which lost out when the St. Lawrence Seaway was built, is well-positioned to take full advantage of the Free Trade Agreement and once again become a major crossroads for commerce. It is the one city in the region with the necessary infrastructure to provide businesses easy access to both nations.

# PORTLAND

## Description

The Metropolitan Area Express (MAX) is a 15.1-mile light rail line from downtown Portland east to Gresham, a small suburb, with 30 stations along the way, five linked to bus routes, five to park-and-ride lots. MAX opened in September, 1988. The trip takes 45 minutes (an average of 20 mph), with 55 mph speeds in an expressway right-of-way for 5 miles. Trains also operate along the median of a suburban arterial (5 miles), in the downtown (1.5 miles), and along an abandoned rail right-of-way (1.7 miles).

Emphasis has been on simple technology and inexpensive operations, with care being taken in appearance and fitting into the environment along the way. The project won the 1991 Citation for Excellence in Urban Design from the American Institute of Architects.

There are no conductors, just self-validating tickets with inspectors. Station shelters are unmanned, but each has a ticket machine, phone with free 911 access in 13 stations, route information, wheelchair lift, map of the surrounding area, and benches. To respect the environment, MAX has quiet equipment, a right-of-way lined with trees, passenger shelters recalling the old buildings that had been part of the scenery, and brick and cobblestone defining station areas.

**A recent public opinion survey found that the public favors light rail to fend off highway congestion like that of Seattle and Los Angeles and achieve growth with a healthy environment.**

The full Regional Transportation Plan calls for an 18-mile westside line, for which bond funds were voted in November, 1990, by a 74% margin. Technical studies have shown that expansion is or will be viable to the south, southeast, north to Vancouver, WA, and then southwest. An intra-downtown vintage trolley network also is planned to start in late 1991.

## Who Chose Rail and Who Pays?

Portland area officials began planning for regional public transit after a 1974 citizen protest against a proposed freeway won the support of Multnomah County and Portland City officials. A task force of all the local agencies and the State coalesced the opposition to the freeway.

A 20-year Regional Transportation Plan was prepared by a Joint Policy Advisory Committee on Transportation (JPACT), composed of elected officials from the whole region plus local, regional and state public transportation officials. It called for improving existing freeways as well as providing additional capacity with public transit. In 1976, the federal government approved transfer of the Interstate highway funds from the unwanted freeway to finance the regional transportation plan.

At first, transportation planners chose exclusive busways on the highway for public transit. But that would pour 500 buses an hour onto the downtown transit mall, designed for 200 buses an hour. Multnomah County favored light rail. Then Tri-Met, the transportation operating agency that would have to provide the transit, agreed, citing busway congestion, uncertainty of oil supply, and lower operating costs of light rail compared to buses.

Tri-Met, Oregon DOT and the Columbia Region Association of Governments held over 100 well-publicized open discussions comparing bus lanes to carpool lanes to light rail to no improvements at all. All necessary local-state approvals were voted in 1978. The U.S. DOT agreed, and Congress appropriated the money. The state provided $16 million (1960-value).

**MAX was built on time and under budget as projected in 1982 when the federal government agreed to finance its portion.**

In 1990, voters in three counties approved a $125 million bond issue to join with federal funds to build a $690 million westside line and develop a southeast line to Clackamas County. The U.S. has approved a $660 million grant for Portland public transit.

A Public-Private Task Force on Transit Financing was set up under JPACT to develop a financing strategy. The Portland Metropolitan Chamber of Commerce and Oregon Business Council set up a Business Committee on Regional Transportation Priorities composed of top corporate executives in the Region to work with the task force. The task force strongly supported extension of the light rail system to the west. It identified four ways to tap increased land value generated by the new service to finance light rail: (1) special assessment districts, (2) sharing station construction costs where private development is occurring simultaneously, (3) tax increment financing in an urban renewal area, and (4) joint development on related publicly-owned land. It estimated that 15-20% of construction funds could be attracted through these mechanisms.

## Goals

"Portland's challenge is to make light rail a tool for ensuring prosperity while preserving the quality of life we treasure in Oregon...to...shape our community for the 21st century," a City Commissioner explained.

The head of the transit agency has the same vision: "Transit is not just for moving people; it's a central part of our strategy to guide growth and protect our quality of life."

Projections anticipate 47% more jobs and 486,000 more people by 2010. A recent public opinion survey found that the public favors light rail to fend off highway congestion like that of Seattle and Los Angeles and achieve growth with a healthy environment. They see light rail as an economical way to achieve this goal.

The Public-Private Task Force compared the $300 million cost of the westside line to an estimated $525 million required to provide equivalent highway capacity, which would not include downtown accommodation of the autos.

The plan is to focus development with increased density--particularly to greatly expand downtown with 50,000 new jobs, 5,000 new housing units and more shopping, events, tourism and recreation.

Focusing suburban economic development around rail stops also is intended. For example, Oregon Graduate Center plans to build 3.2 million square feet of high-tech office and research facilities connected by rail to existing high-tech companies.

Improved access speed and lower operating costs than buses were further objectives.

## Transportation Results

MAX was built on time and under budget as projected in 1982 when the federal government agreed to finance its portion.

Early ridership projections (1978) for the seventh year of service are likely to be higher than will be attained in that year (1995), because the region's economy lost ground in the recession of the early 1980s rather than continuing to grow as expected. Multnomah County, for instance, lost 25,000 jobs. But 1985 ridership projections were exceeded in 1986-1987, the first year of service.

Operating costs are well below 1978 projections ($81.86/vehicle hour projected, $57.77 actual--both in 1988 dollars).

The cost per passenger in 1988 was about the same as for bus passengers, but the cost per passenger mile is only 26¢ compared to 40¢ for bus passengers. MAX returns 52.7% of its operating costs in fares, with buses returning only 30%.

Downtown jobs have increased by 30,000 since the 1970s, but traffic is at 1972 levels. A 1987 study by Portland General Electric showed that MAX attracted 6,500 new transit riders. They typically would have filled more than three lanes of freeway for an hour. A marketing effort reaches 4,000 households a month, producing an average of more than 700 new transit riders monthly.

Unexpectedly, MAX has attracted many riders on weekends, making it a vehicle for the journey to shop and play as well as to work.

## Other Benefits

Portland's downtown is booming along with the suburban downtown at the east end of the line, Gresham.

In spring 1986--before MAX--only 46% of persons polled thought Tri-Met was doing a good job. In November 1989, 96% of the public polled said they liked MAX, and a substantial majority want it extended. Three out of four thought Tri-Met was doing a good job.

In 1972, downtown air was so dirty it violated federal health standards one out of every three days. Today, with many more jobs and activities, Portland's air is healthy every day.

An editorial in the Oregonian, just two months after MAX opened, said, "A government project that works better than it was expected to is sufficiently unique that both politicians and constituents should be permitted to spend a while just gloating." The editorial added these lessons from the success: people will ride public transit if it's convenient, efficient and reasonably comfortable; the trade-in for an unbuilt freeway looks like not such a bad deal; and government can efficiently spend some money and deal with problems.

By the end of MAX's third quarter, developers observed a sharp rise in property values along the line. And after three years, nearly $1 billion of development was completed or under construction along the rail line, over 90% downtown. Most of the investment is private, office and retail with some housing. Several of the new developments incorporate MAX in the development, making light rail the easiest way to get there.

The Public-Private Task Force on Transit Finance found these opinions among 54 owners of businesses near the line in 1988, two years after MAX began service:

-- 96% supported further light rail lines;

-- two-thirds said that MAX had helped their business, with 22% commenting "greatly";

-- 69% said they would want to locate a new business site near MAX; and

-- it stimulated improvements in store appearance.

Gresham stores have begun staying open on weekends because MAX brings people there from all over the region.

A year later, the general public was surveyed and

-- 75% said MAX should be extended;

-- 45% are willing to pay a $15 auto registration fee to help finance it, and another 8% were deemed susceptible to persuasion;

-- 81% believed that MAX can keep traffic congestion from getting worse if it is expanded from one line to a full system, and 70% said it is less damaging than added road space; and

-- 57% said it helped keep Portland's quality of life.

MAX also has provided the extra capacity needed for special events. For example, it handles about three times the normal daily riders for the annual Rose Festival, and it allowed the City to locate its convention center beyond walking distance from hotels.

"There's a positive feeling all over town. Both our stores have increased their volume every month since light rail opened, and Sunday is our best retail day of the week."

Bob Bergeron, Owner, W.R. Hicks Co. and
Pacific Crest Clothing Co.

"We are very reliant on transit. Without it, the alternative is increased cost for roadway construction and greater congestion for motorists which may have a negative effect on continued growth and economic development in the county."

Bonnie Hayes, Chair
Washington County Board of Commissioners.


# SAN DIEGO

## Description

San Diego began its 15.9 miles of rail service (called the Trolley) from downtown south to the Mexican border in July 1981 and is operating on 18.8 miles of an East line opened in three segments, 1986 to 1990.

The plan calls for 33 more miles of light rail and 43 miles of commuter rail by 2000, now being considered, planned or designed.

Rail service is coordinated with bus service under the umbrella of the Metropolitan Transit System (MTS). Existing service runs through industrial areas and neighborhoods of both low- and middle-income families to downtown.

Most of the lines are on existing railroad rights-of-way. Emphasis is on keeping costs down. Stations are unmanned and have ticket machines. There are no conductors, only roving inspectors. It is estimated that about one rider in 100 evades the fare.

## Who Chose Rail and Who Pays?

The Metropolitan Transit Development Board both plans and operates public transit in the southwestern portion of San Diego County centered on the City of San Diego. The Board, established by the state, began in 1976. Its 15 members are selected from and by the San Diego City Council, the councils of nine smaller cities and the County Board of Supervisors. The chairman is elected by the Board.

In 1987, voters in the transit district approved a half-percent sales tax increase, a third for rail transit, a third for local roads, a third for freeways. Polls indicated that the funds for the Trolley had stronger support than for roads, and it was featured in promoting the measure.

State funds from several transit-financing laws provided the funds for the first segments: gas tax money set aside for fixed guideway construction, funds from a quarter percent sales tax, and State Transit Assistance funds.

The federal government provided 58% of the $101 million spent on an 11.1-mile segment of the East line that opened in 1989. No federal funds were used on the first line.

## Goals

Rail service was chosen as a relatively inexpensive way to attract drivers from cars and provide good access for those without cars. Now, city councils are beginning to consider relating land use to the rail system.

## Transportation Results

Cost and construction schedule projections have been achieved. Weekday trips estimated at over 56,500 in October 1990 exceed the number projected for 1995. Total transit ridership, bus and rail, increased in the South line corridor by 275% since 1981 and in the East line corridor by 250% in just a year. When last surveyed, in 1984, about a third of the riders said they formerly drove. If one-third of the added riders since 1984 also shifted from driving, the Trolley is carrying people whose cars otherwise would be filling four expressway lanes for an hour to the east and eight lanes to the south.

Speeds in the corridors served are competitive with the automobile during rush hours, averaging 30 mph on rail rights-of-way and nine mph downtown.

Operating costs are unusually low, 86 cents a passenger, 13 cents per passenger mile; 92% of operating costs come from fares, up from 81% in 1982. Buses in San Diego cost $1.54 per passenger, 32 cents per passenger mile, repaying 44% from fares, up from 40% in 1982. Even amortizing capital, rail costs less per passenger mile than bus.

Bus passengers decreased between 1977 and 1983 and have been rising since, an increase of 20% 1983-1988; bus passenger miles travelled were up about 13%. The transit agency Chairman has said that the Trolley stimulated the increase in bus use in the corridors served by rail. "It's gotten through to people that transit can be a pleasant experience."

**...Even amortizing capital, rail costs less per passenger mile than bus...**

## Other Benefits

San Diego area business, government and transit leaders interviewed by the Texas Transportation Institute said the Trolley has had a positive impact on the quality of life and the attractiveness and accessibility of the city. It has added to San Diego's positive image, particularly for visitors, and to the reputation of the transit agency. The public sees light rail preparing for the future to avoid becoming like Los Angeles. The name is used to advertise the city and several nearby facilities also have used the name Trolley.

Light rail has not been used aggressively to shape development, but two joint development projects are underway downtown: a $200 million, 912,000 square foot project with a 34-story office tower, a 272-room hotel and restaurant, retail and museum space, and a 180,000 square-foot office building with retail space. Also, the county built a major complex at the confluence of the two rail lines. Generally, the Trolley is believed to have contributed to downtown growth.

The Trolley has helped carry surge loads, the 1989 Superbowl events and activities at the Convention Center.

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**Weekday trips estimated at over 56,500 in October 1990 exceed the number projected for 1995.**

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# SAN FRANCISCO

## Description

The San Francisco Metropolitan Region is building an integrated rail network in addition to its several bus systems. There are four rail systems: (1) the San Francisco Municipal Railway (MUNI), providing light rail on the streets and in a downtown tunnel and cable cars and vintage trolleys; (2) the Bay Area Rapid Transit (BART), bringing East Bay commuters into San Francisco and downtown Oakland and Berkeley and increasingly connecting suburban clusters of jobs and apartments; (3) Caltrain, a State-operated commuter rail system, connecting San Francisco and San Jose; and (4) Santa Clara light rail, now a single line through downtown San Jose.

MUNI Light Rail has five routes and 50 miles of line. Concurrent with the construction of BART underground through downtown San Francisco, MUNI service along Market Street was also placed underground, where the two systems share several stations. In 1983, MUNI adult monthly passes became usable on BART within the city at no extra charge, making BART part of the local rail system and generating record BART ridership.

Several additions to MUNI totalling 2.5-miles are under consideration to accommodate increased demand and serve major new development and the terminal of the Caltrain commuter rail line to San Jose.

To relieve overcrowding on cable cars, used heavily by tourists, vintage streetcar service is proposed from the western end of Market Street to the Ferry Building and an additional 2.50-miles along the waterfront to Fisherman's Wharf.

The BART system opened in 1972. It serves a population of 2.6 million in three counties, Alameda, Contra Costa, and San Francisco, and 15 municipalities along its 71.5-mile system.

Plans for an additional 33 miles are well along in three East Bay corridors; two in Alameda County and one in Contra Costa County. Most of the $2 billion is in the design stage, with construction expected to begin in 1991.
A one-station extension south into San Mateo County is due to open in 1992, with eventual extension to the San Francisco International Airport.

Caltrain operates commuter trains over 47 miles, with a proposed extension to a central downtown terminal in San Francisco. In San Jose, Caltrain now connects to Santa Clara's light rail.

Santa Clara light rail, opened in 1987, now extends 20 miles through a downtown San Jose transit mall. An extension of between nine and 14 miles is expected to be approved.

## Who Chose Rail and Who Pays?

The Metropolitan Transportation Commission (MTC), the transportation planning agency for the nine-county San Francisco Bay metropolitan region, brings the elements of the public transit system together into a coherent plan and has the authority to allocate capital funds among them. It plans in consultation with local, state and federal officials.

MTC's 1988 plan of major rail extensions, slightly amended in 1989, is financed and under preparation. It assumes less than 30% federal and 10% state contributions. Local contributions come from dedicated sales taxes and a rise in bridge tolls, which will pay for added rail capacity likely to relieve bridge traffic. Seven counties agreed to the toll rise in 1988.

The 1988 plan was enthusiastically supported by area media. *San Francisco Business Times* called the plan "the most heartening display of regional cooperation in recent memory."

During the 1980s, a decade when voters were less than enthusiastic about increasing their taxes, Californians supported transit several times. In 1985, San Mateo County voters approved the use of existing tax funds for rail projects, including the first stage of a BART extension southward from Daly City to Colma and the airport, scheduled to open in 1992. San Mateo County approved an additional sales tax for public transit in 1988 as did Contra Costa County. In 1986, voters in Alameda County approved an additional 1/2-cent sales tax to help fund a BART extension between Dublin and Warm Springs. Three major public transportation ballot measures approved by California voters in November 1989 assure a significant portion of the funds for the extension program. San Francisco approved a 1/2-cents sales tax for transportation in 1989, about 60% for transit--mostly for MUNI light rail and buses. It is expected to produce $900 million over 20 years. Approval of public transit bonds and a gasoline tax rise--some for transit--by state voters in June 1990 will aid existing systems, such as BART, and new systems.

**During the 1980s, a decade when voters were less than enthusiastic about increasing their taxes, Californians supported transit several times.**

## Goals

Reducing auto trips as jobs and population grow is the first goal. For the eighth year, transportation was called the number one San Francisco region problem by residents polled annually by the Bay Area Council, a regional business forum. Air pollution was called a "serious problem" by 84%, and 80% said they would use public transit or a car pool one day a week to improve the air.

From 1980-1988, San Francisco region population grew at an annual rate of 1.4%. For the period 1986-2000, projections suggest it will grow at a rate of 1.1% a year.

"...in a Chronicle Poll of Bay Area residents earlier this year, 87 percent of respondents said rail systems should be expanded with public funds to reduce the region's traffic. Only 42 percent favored spending more for freeways."

*San Francisco Chronicle*,
March 19, 1991.

## Transportation Results

All the rail systems have maintained or reduced their operating cost per-vehicle-hour of operation and per passenger mile in stable dollars. BART has reduced costs substantially.

Since BART first opened in 1972, BART trains have carried more than 800 million people on more than 10 billion passenger miles. A 1990 study showed that 35% to 40% of people who live within a short walk of BART use it.

In the period ending June 30, 1990, rides increased 16% over the previous year to 70.5 million. BART retained 15% of new daily users who crowded into BART trains immediately after the October 1989 earthquake.

BART riders pay about half the operating costs.

The Natural Resources Defense Council has calculated that the energy required to build the BART system was only a third of the energy that would have been required to accommodate the cars that BART diverted to public transit.

Looking at MUNI, substantially reduced travel time in the downtown tunnel and improved passenger convenience increased MUNI rail patronage dramatically to 40 million in 1988-89. Average weekday boardings have risen to about 130,000, more than 35% above a decade earlier. Bus ridership also increased.

MUNI riders (bus and rail) pay about 30% of operating costs.

During the 1980s, Bay Area daily riders on commuter rail also increased from 14,500 to 22,000. The increase was helped by the earthquake and strike against Greyhound, which operated express buses under contract for Samtrans, the public agency. Riders pay about a third of operating costs.

The Santa Clara light rail's 3 million annual rides are more than projected when the line opened. The most recently-opened segment came in under budget and ahead of schedule. However, only about 3% of operating costs come from revenues.

## Other Benefits

Since 1964, commercial and office space has been added in and around BART stations with an estimated value of $3 to $4 billion. Approximately 21 million square feet of space in 40 major office buildings, all within a short walk of BART stations, have been built in the downtown San Francisco area.

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**All the rail systems have maintained or reduced their operating cost per-vehicle-hour of operation and per passenger mile in stable dollars.**

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Oakland is building two massive redevelopment projects around its City Center station. The City Center Project will include new world headquarters for the American President Companies, Ltd., a shipping conglomerate, the Clorox Co., the Hyatt Regency Hotel and Convention Center; and a new federal building to house 4,000 government employees.

Six suburban stations are the sites of concentrated new construction, including:

Pleasant Hill - 25-miles east of San Francisco, seven projects totaling 865,000 square feet and an Embassy Suites Hotel; 1.5 million square feet of office, hotel and retail projects is being considered.

Walnut Creek - 1.5 million square feet of office space.

Concord - large office and retail development replaced small buildings. Bank of America relocated 3,500 employees from downtown San Francisco.

"The connection between business and transportation access has not escaped the attention of private developers who hope to capture the benefits of public transit by investing in joint development projects in the vicinity of transit stations....Developers of the Hacienda Business Park in Pleasanton, which expects to have 35,000 employees by the year 2005, recently put up $4 million to help purchase and preserve the San Ramon Branch right-of-way, which is being studied for a possible light rail line. In the meantime, the Hacienda Owners' Association is subsidizing at a cost of $350,000 a year a shuttle that connects the property to the Bay Fair Station."

In testimony before the Senate on May 13, 1986, Robert I. Schroder, Chair, San Francisco Bay Area Metropolitan Transportation Commission.

The Santa Clara light rail line is part of a downtown redevelopment program in San Jose that has included a transit mall and convention center.

## SOUTH JERSEY

### Description

This 14.2-mile line from Lindenwold, New Jersey, to downtown Philadelphia opened in early 1969, the first postwar new rapid transit line in the U.S. Built and operated by a subsidiary of the Delaware River Port Authority, the Port Authority Transit Corporation (PATCO), the line is served by New Jersey Transit feeder buses and links to Atlantic City at the New Jersey end and Amtrak nationally in Philadelphia, as well as Philadelphia's rapid transit and light rail systems.

It is automated with one attendant on board. Stations are not manned; automatic ticket machines provide cards that open gates.

### Who Chose and Pays for Rail?

The project was initiated by the Port Authority and approved by the governors of New Jersey and Pennsylvania, with plans reviewed by local officials. Port Authority bonds paid the original $96 million investment, repaid from bridge tolls. Subsequent capital

funds have come 80-90% from the U.S., the remainder from toll-backed bonds. Operating subsidies also come from bridge tolls.

## Goals

Competing with the auto in speed and comfort and low operating costs were important goals.

A plan for public transit in southern New Jersey was commissioned by the Port Authority in 1954. The consultant recommended an expensive system. A second consultant found a much less expensive way to provide service. Automation allows the fastest possible acceleration and deceleration, which not only shaves minutes off the traveller's time but enables PATCO to turn trains around fast enough to save the equipment required by one rush-period run.

## Transportation Results

PATCO gets 74% of revenues from fares without a fare rise since 1983. It carries 58% of all Camden County commuters to downtown Philadelphia and 47% of all New Jersey commuters to Philadelphia.

PATCO provides parking for 12,300 cars at its stations. In the last months of 1990, the parking lots were full. A 1983 survey found that over half the riders travel more than five miles to get the train, and three out of eight riders travel l0 miles or more. About 70% of riders get to the stations by car.

The on-time record is nearly perfect, averaging above 99% most years. Travel speed is 32 mph.

Total number of riders has levelled off at about 11 million a year. Weekday and weekend use is stable, and ridership estimates continue as projected.

**PATCO gets 74% of revenues from fares without a fare rise since 1983.**

# TORONTO

## Description

Toronto was the first North American city to add rail rapid transit after World War II, deciding in 1946, beginning construction in 1949, and opening 4.6-miles in 1954.

The system now serves a 264-square mile region with 34 miles of rapid transit, 46-miles of street car, and 4 miles of an intermediate-capacity automated elevated rapid transit system. Prewar streetcars have been continued and some new articulated extra-length cars added. In addition, there are 106.6 miles of commuter rail.

**Since 1970, rail transit has been an integral part of the regional plan, supporting high-density subcenters as well as downtown.**

The province announced last year a $5 billion capital expansion of transportation infrastructure, which would nearly double rapid transit route miles,

initiating some circumferential connections in the suburbs, extending light rail and building a new streetcar line. At the same time, major expansion of commuter rail lines and service are underway.

## Who Chose Rail and Who Pays?

Toronto voters in a 1946 New Year's Day referendum chose rail rapid transit, 79,935 to 8,630. Elected officials are appointed to the five-person Transit Commission, which operates under the Metropolitan Toronto government.

The provincial government now pays 75% of the capital costs, an increase of provincial support from 50%, 1960-1971. The municipal government pays 25%. The first four miles were financed entirely from a municipally-guaranteed bond issue. Subsidies are shared equally by the province and the municipality. Fares pay 68% of operating costs.

## Goals

The first goal was to relieve overcrowded streetcars.

Since 1970, rail transit has been an integral part of the regional plan, supporting high-density subcenters as well as downtown. The two subcenters, each about 10 miles from Toronto's downtown, are designed to these dimensions:

-- North York: 27,000 residents, 63,000 jobs, 20 million square feet of nonresidential space.

-- Scarborough: 16,000 residents, 40,000 jobs, 10 million square feet.

A recent planning document for the greater Toronto area states, "With limited opportunities to increase road capacity, the percentage of travel by transit must increase significantly across the boundaries of Metropolitan Toronto..." into the outer suburbs. The commuter rail network is being expanded instead of expanding highways.

Recently, emphasis has been on environmental benefits of electrically powered transportation.

## Transportation Results

Generally, performance has improved on projections both in ridership and cost. On a typical business day in 1989, 601,000 paid trips were taken on the subway and Scarborough rapid transit.

In 1986, 28% of all trips in the greater Toronto area were on transit, on foot or on bicycle. The goal is 33% by 2011. Looking just at work trips within metropolitan Toronto, more than 43% are on transit, foot or cycle. This compares to 24.5% in the Chicago region, 22.5% in the San Francisco region and 11.9% in the Los Angeles region. Two-thirds of daily trips to downtown Toronto are on public transit.

In 1980, Toronto had nearly half again as many public transit trips per capita as the New York and Chicago areas and nearly twice Washington, D.C.'s. New York City residents used 26% more gasoline per capita.

Percent of operating costs from revenue, bus and rail combined, hovered around 70% through the 1980s.

> "Experience in Toronto shows that in 15 years with integrated transportation and land use policies a heavily auto-oriented city with a dead heart has turned into one of the leading models of alternative transportation systems and one of the most exciting city centers in North America."
>
> Kenworthy and Newman, "Learning From the Best and Worst" study of 32 cities' transportation.

## Other Benefits

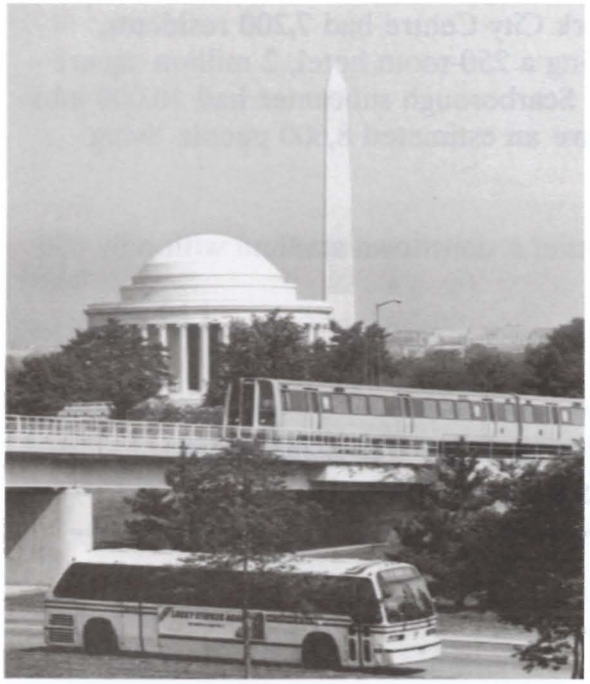
The most notable achievement of rail transportation in the greater Toronto area is its close integration with land use. About $60 billion have been committed to development near rail stations since 1954.

**Downtown, the subway stations are clearly visible from the air because high-density projects have been built on top or adjacent to them.**

By 1989, in the two subcenters: North York City Centre had 7,200 residents, 17,634 jobs, $250 million in development, including a 250-room hotel, 2 million square feet of office space, a retail mall, a new library. Scarborough subcenter had 10,000 jobs with no residents. One project underway will have an estimated 8,000 people living and/or working there.

Good public transit allowed Toronto to build a downtown stadium with only 600 parking spaces.

**In 1986, 28% of all trips in the greater Toronto area were on transit, on foot or on bicycle.**



# WASHINGTON, D.C.

## Description

Washington Metrorail consists of 75 miles of line extending from downtown Washington into Maryland and Virginia, serving a 1,500 square-mile transit region. Financing for 100 of the planned 103-mile system has been authorized by the Federal government.

A 4.6-mile segment was opened in 1976, 30.7-miles by 1978. Additional portions opened in four segments by September 1990 and the latest 1.66-mile extension in May 1991. Another 6.5-miles is planned to open by the end of 1991.

Washington Metro designed the cars, the stations and the methods of building the system. Trains are automated like a horizontal elevator but manned for extra safety.

The American Institute of Architects, the American Society of Civil Engineers, the U.S. Department of Transportation, and National Endowment for the Arts have honored Metro for aspects of its design.

## Who Chose Rail and Who Pays?

In 1960, the U. S. Congress, supported by President Eisenhower, set up an agency to plan a rail transit system for the Washington, D.C., area. President Kennedy also called for a rapid transit system, saying that adding highway capacity would cost more than rail transit in dollars, disruption and ugliness. In 1967, Congress set up the Washington Metropolitan Area Transit Authority (WMATA) to build a rail system. President Johnson declared that the system should be designed to "be an example for the Nation and to take its place among the most attractive in the world." He urged planners to "search worldwide for concepts and ideas..."

Metrorail planners followed a very public process for designing the system, beginning with interviews with local officials about their land-use plans. Three systems were compared and public hearings held on the preferred option. The WMATA directors then voted on the final plan. There are two directors and two alternates from the District, from Virginia and from Maryland. In the District, both the mayor and the city council appoint members. Transportation agencies in suburban Maryland and Virginia appoint directors from among their members.

In 1968, five local jurisdictions--two suburban counties and two cities in Virginia, one county in Maryland--held referenda on whether to issue bonds to finance the local share of rail construction. Voters in all five jurisdictions approved, with an average vote of 71.4% in support. Elected officials in the District of Columbia and one Maryland county approved the bond issues without referenda.

In 1969, Congress voted a $1.1 billion 10-year financial package. President Nixon wrote, "You may be certain that this Administration will continue to exert every effort to assure the completion of this most vital transportation link."

Every Congress and Administration since has reconfirmed federal support, though the last two Administrations have tried to limit severely federal contributions. The District of Columbia contributes the largest share of the local contribution, totalling 40% of operating subsidies and 37% of construction.

Initial funds were two-thirds federal, one-third local. In 1980, Congress and the President approved an additional $1.7 billion for construction, to be matched on a 20% local, 80% federal ratio. Recent reauthorization of federal funds, $1.3 billion for eight years, is on a 62.5% federal-37.5% local basis. Of the $7.2 billion cost so far, $2.6 billion of the federal contribution has come from local governments trading in funds allocated to portions of the Interstate Highway system.

Several additions to the 103-mile agreed-on system are being considered--extensions, such as to Dulles Airport--and connections, such as circumferential service to relieve the Beltway, particularly between Bethesda and Silver Spring.

## Goals

Buttressing the region's land-use plans, reducing suburban sprawl and achieving a high order of appearance and safety were stated goals. The system was designed not only for beauty but to thwart anti-social behavior such as graffiti and crime.

Bringing the 30 million tourists who visit the capital annually to the attractions they come to see was a special goal.

**Rail was considered important to reduce auto emissions and to avoid adding highway space in constricted areas.**

## Transportation Results

Since rail service began in 1976, annual transit trips have increased by 90%. Rail now carries more riders than bus, 145 million a year vs. 140 million, and carries nearly twice the passenger miles. In addition to the 145 million rail riders, there are 13 million more bus trips per year than when rail began. Weekday riders on bus and rail are near a million, second only to New York in the U.S. Going to the Washington central business district, the percentage of travellers arriving on public transit increased from 32% in 1977 to 40% in 1988, or a 25% rise in transit's share. WMATA has calculated that 100,000 more cars would be on the roads daily were it not for Metrorail.

WMATA has organized rail and bus into an integrated system. More than a third of Metrorail riders reach rail by bus.

Washington's transit riding increased faster than its driving between 1984 and 1987: vehicle miles of travel on major arteries went up by a quarter, passenger miles of transit travel by a third.

Each rail rider costs $1.69, or 23¢ per passenger mile. Each bus rider costs $2.08, or 48¢ per passenger mile. Cost per passenger mile on rail is back down to where it was in 1981 after rising to 31¢ a mile in 1984. Bus passenger mile cost is nearly twice what it was in 1981.

Rail obtains 76% of costs from revenues, up from 58% in 1983; bus returns only 33%, a declining percentage since WMATA took over in the early 1970s and down from 40% in 1983.

Rail is perceived to be more attractive than buses to those who don't ride either regularly. A 1989 survey of office employees and visitors, residents, shoppers and hotel guests showed that nearly everyone, even those arriving by car, thought Metrorail clean and reliable, but only a small minority of those sampled thought the same of buses.

Metrorail has improved air quality, according to the Metropolitan Washington Council of Governments.

A high degree of safety has been achieved. Metrorail riders are 1,000 times safer than travelling in their own car, more than three times safer than in a Metrobus.

**...100,000 more cars would be on the roads daily were it not for Metrorail...**

Metrorail stations are served by 32,000 publicly-owned parking spaces, but local governments are beginning to encourage feeder bus use instead. Fairfax County reduced bus fares to 25¢ and raised parking charges to $2.00 at some lots and $2.50 at others.

The 1989 survey of travellers to office buildings, stores and hotels and from apartments near Metrorail stations found:

-- Rail trips for non-work purposes increased significantly since a similar survey was taken two years before.

-- While many more trips to downtown destinations than to outlying sites are on Metrorail, facilities close to suburban rail stations generate significant percentages of rail ridership. The survey team concluded that a 200,000-square-foot office building near a Metrorail stop would generate 500,000 fewer auto miles per year than one that was not near a rail stop.

-- Transit riders stopped off for errands on their way to work as often as motorists did, contradicting a frequent argument for driving and suggesting to the survey team that development along rail lines be planned to provide a wide range of services.

-- Shoppers were surveyed at eight retail clusters. At the three downtown stores, only about one in five had come by car; about one in three came by Metrorail. More shoppers came by Metrorail than by car to two suburban stores and about the same number to a third.

-- Even hotels are beginning to collect large numbers by public transit: a quarter of those surveyed at 10 hotels within walking distance of Metrorail stops--six in the suburbs, three downtown, one elsewhere in the District. At six of the 10 hotels, more than a quarter of the overnight guests came by Metrorail; four of these six were suburban hotels.

-- Apartment complexes near Metrorail not only draw residents to use rail--46% of all trips were on public transit--but apartment residents also have fewer autos per household than in comparable housing beyond walking distance from Metrorail. Fewer cars result in fewer auto trips.

-- Two-thirds of those using Metrorail to the office buildings surveyed have a car they could have used.

-- About half the work trips to the surveyed downtown office building were on transit, 44% on rail. Outside downtown but within the Beltway, an average of 15.6% of work trips were on transit. Outside the Beltway, 9.5% were on transit. As many as one-third of the visitors to the suburban Bethesda Metro Center building arrived by rail!

-- Average travel time to work at the surveyed offices is only 7.7 minutes longer (17.5%) by public transit than by car even though these offices draw employees from throughout the region.

-- Distance from the rail stop affects shopping more strongly than offices and offices more strongly than residences.

As a result of these findings, the survey team recommended dense compact developments around Metrorail stations with good auto access that does not intrude on adjoining neighborhoods, as well as varied services and facilities in transit corridors.

## Other Benefits

Over the years 1980-1988, 38% of the new commercial space in the region was located within .7 miles of a Metrorail station, accounting for 43% of the new construction value in the region.

Above the central Metrorail station in downtown Washington, an old department store has been renovated and a 620,000-square-foot complex has been built. Offices, hotels, stores and apartments have been built at several outlying Metrorail stations since construction was planned, including very large office centers at Crystal City and Rosslyn.

For Washington's many celebrations, Metrorail provides high capacity service. In 1988, when the Redskins were welcomed after their Superbowl win, 564,000 people rode Metrorail, and for the 1989 Presidential Inaugural, 604,000 passengers were served, a new one-day ridership record. On July 4, 1990, Metrorail carried nearly 200,000 people in two hours!

**...38% of the new commercial space in the region was located within .7 miles of a Metrorail station, accounting for 43% of the new construction value in the region...**

# V

# WHAT RECENT EXPERIENCE SEEMS TO MEAN

## Land Use As Well As Transportation Improvements

While most new rail systems are built in response to transportation needs--to reduce traffic delays, improve air quality and avoid new highways--the use of rail to shape metropolitan development is an increasingly important element in the decisions.

Metropolitan areas are trying to modify development trends to protect their environment and improve the quality of life. The desired pattern is a stronger downtown strengthened by added offices, shopping, entertainment, hotels and apartments. Those facilities that locate in the suburbs and outer areas of the city would be clustered in smaller centers, not spread and scattered through the countryside or along main aerteries.

> "We need to improve the linkage between transportation, development and land-use planning."
>
> U.S. Secretary of Transportation Samuel K. Skinner,
> December 10, 1990.

Rail transit stations are magnets around which clustering is taking place--large and dense in city centers, smaller and usually somewhat less dense farther out. The substantial investment in fixed guideway transportation to signal developers they can make long-term investments without concern that later administrations may withdraw the commitment.

"I think the thing that has given the most security and the most assurance that we're going to have high quality growth is that we have built a mass transit system. Development in our city is around mass transit stations. Around every stop north of our city, we have about $l billion of development."

Former Mayor of Atlanta Andrew Young.

Recommending less sprawl and more compact urban development for Florida, the Governor's Task Force on Urban Growth Patterns said: "Properly planned and implemented, fixed guideways can exert a direct and powerful influence on the location of new development and redevelopment....The Task Force believes that development of fixed guideways could make a significant positive contribution to desirable development patterns in several of Florida's largest urban areas."

**While most new rail systems are built in response to transportation needs--to reduce traffic delays, improve air quality and avoid new highways--the use of rail to shape metropolitan development is an increasingly important element in the decisions.**

The reasons for investing in rail transit, to compete better with auto travel and reshape the metropolitan pattern, usually begin with the recognition that the traffic congestion that has spread to the suburbs will not be inexpensively solved by more pavement. Analysis carried out before commitment to rail transit has demonstrated in many places that, for the service provided, widening expressways or inserting new ones into the metropolitan fabric costs more than rail transit in dollars and in disruption of neighborhoods and people's lives. Furthermore, as incomes rise, more cars are bought and the added road space fills up to congestion levels again.

In addition to handling traffic efficiently, by encouraging clustering of activities and housing, rail transit has:

-- Improved air and water quality and helped to combat global warming and acid rain. A recent study by the Natural Resources Defense Council (NRDC) found that doubling density reduced vehicle miles of travel by 25-30% everywhere in the world. They also found in California that wherever public transit added a mile of passenger travel, 10 vehicle miles of travel were reduced. In other metropolitan areas, it looks as though each added transit passenger mile has meant a reduction of 4-5 vehicle miles of travel.

-- Provided a focus for community and a place for community activities that had been missing from metropolitan life.

-- Provided more varied types of housing and densities, offering more choices appropriate for young people who have fewer children than their parents had and for the increasing number of households whose children have left.

-- Attracted new investment and jobs to cities that had been faltering.

-- Encouraged metropolitan areas to think more regionally and plan together.

## Both Local And National Benefits

In addition to the positive effects on overall community development, many of the transportation goals of urban rail transit have been achieved. Here are the benefits that frequently come with urban rail transit:

1. For the Nation and the Community

   a. Lower vehicle emissions and more rapid progress in clean air attainment.

> "Much greater weight will be placed on meeting the need for clean air."
>
> U.S. Secretary of Transportation
> Samuel K. Skinner, December 10, 1990.

b. Increased energy conservation. The single-passenger automobile uses over 10 times the energy per passenger mile of intercity rail or bus, over seven times light rail and city bus, and six times rapid rail.

c. Enhanced worker productivity through reductions in time spent in congested traffic.

d. Reduced trade deficit as imported oil requirements are reduced.

e. Strengthened society by more effectively linking jobs to inner city neighborhoods.

f. Strengthened economy by increasing travel dependability, particularly during bad weather but also during disruption of oil supply.

g. Improved ambiance through reduced car and truck traffic.

h. Strengthened downtowns by allowing more compactness and easier and more pleasant pedestrian flow. Trains can run underground without ventilation where electric propulsion is used.

i. Capacity for substantial growth at low marginal cost.

j. Ability to handle surge loads for special events, such as sports, conventions and parades.

2. For the rider.

a. Cost savings for those who had driven. The American Automobile Association found typical driver costs over 34¢/mile, before Iraq invaded Kuwait. Hertz estimated an average driver's cost at 57¢ a mile. Few rail operations cost that much per passenger mile.

b. Time saving both for former motorists and bus riders.

c. Greater dependability.

d. Greater safety. Fatality rates per billion passenger miles are .7 for rail rapid transit, 6.4 for autos in metropolitan areas.

e. Greater comfort compared to buses.

f. Enhanced accessibility for those who cannot drive, including the urban poor, young people, elderly and handicapped.

3. For the motorist.

a. More peak-period space on roads.

b. Alternative to driving in bad weather, during natural catastrophes and to large-scale special events.

4. For the transit system.

a. Operating cost savings compared to buses with the prospect of long-term total saving.

b. More efficient use of buses.

c. More patrons.

To achieve these goals, public transit must compete with the auto in speed and attractiveness. The Kenworthy and Newman study of 32 cities around the world found that the higher the public transit speeds, the lower the gasoline consumption in the region. Urban rail generally provides that high transit speed.

## Public Preference For Rail

But preference for rail transit often is unrelated to specific characteristics such as speed. In the study, *Urban Rail in America*, a study for the U.S. Department of Transportation, Boris Pushkarev found places where the number of riders could only be explained by their preference for rail over bus because there was no cost or speed advantage. He also found that people were willing to walk two to three times further to take a train than a bus and would even take feeder trips to rail.

**...for the service provided, widening expressways or inserting new ones into the metropolitan fabric costs more than rail transit in dollars and in disruption of neighborhoods and people's lives...**

A recent survey in Sacramento corroborated that: 35 percent of light rail riders walked more than half a mile to get the train in the morning but only 13 percent of bus riders walked that far. The survey also showed that 77 percent of light rail riders but only 45 percent of bus riders had a car and could have driven. And half of Sacramento light rail riders have incomes over $40,000 compared to only a quarter of the bus riders.

When asked whether they would be likely to use public transit in Norfolk and Virginia Beach, residents chose light rail two to one over buses. A Minnesota poll found 81 percent of Twin Cities residents favoring light rail in spite of considerable publicity for arguments against it by the influential Citizens League.

In interviews in four recent rail cities, Atlanta, Miami, Portland and San Diego, business, government and transit leaders told the Texas Transportation Institute that rail is perceived to be more dependable, comfortable, and attractive and offers a positive image to potential users and non-users alike. Indeed, the Institute found that cities use their rail transit as a selling point to outsiders.

## No Regrets, Only Expansion

All of the new rail cities are planning extensions. None regrets the existing investment, despite initial estimating errors related to ridership and cost on some systems during early planning stages before final decisions were made. Today, however, estimating techniques have been improved with projections on the conservative side. For example, the Los Angeles light rail service that just opened is exceeding ridership projections, and Sacramento is experiencing lower operation costs than originally expected.

Where growth in the use of rail transit has been slower than expected, metropolitan leaders have been patient because benefits are visible, particularly business attracted to the rail stops.

## Importance Of Long-Term Vision And Perspective

Decision-makers increasingly consider long-term broad benefits rather than short-term operations. They recognize that rail transit is a long-term investment and that other long-term investments such as dams, highways, space exploration, weapons frequently ran over the projected budget. Furthermore, highways often missed their projected traffic estimates. For example, projections of traffic by the highly-regarded Port Authority of New York and New Jersey for the George Washington Bridge (1931) were well ahead of actual traffic for 18 years. Then traffic exploded far beyond the estimate, and by 1960, traffic was nearly 2.5 times the original estimate. Similarly, the Port Authority's Lincoln Tunnel traffic estimates far exceeded reality for nearly a decade, and the second tube opened four years later than scheduled. On the other hand, the Long Island Expressway operated at peak-hour capacity when it opened, suggesting considerable underestimation.

"Anyone who has ridden Metro (Washington D.C.)--or any of the even newer systems in such cities as Baltimore, Buffalo or Pittsburgh--has been introduced to the future of mass transit. It is clean, convenient, safe and economical. In and of themselves, perhaps, those attributes may not be worth the billions plowed into subway systems. What helps to make the whole package worthwhile, however, is the addition of such benefits as increased employment opportunities and property values, decreased traffic congestion and pollution, and even an immeasurable boost in civic pride. A well-run mass transit system is a real plus for a community."

*The Northern Virginia Sun*

**...All of the new rail cities are planning extensions. None regrets the existing investment...**

# VI

# MAXIMIZING THE POTENTIAL OF RAIL TRANSIT

Realizing the enormous potential of rail transit requires aggressive action on a number of fronts, as outlined in the Action Agenda chapter. Two of these action agenda items deserve additional emphasis.

## Integrating Transportation and Land-Use

> "Many concerned citizens and public officials...emphasized the need for...a stronger link between planning and transportation decisions."
>
> U.S. Department of Transportation, "A Statement of National Transportation Policy," February 1990.

Rail transit will realize its full potential only if development clusters around stations. While there is general agreement that ridership projections should be improved, more important is a strategy of federal, state, regional and municipal planning and urban policy to make the ridership projections happen. For example, the Sacramento 1990-94 transit plan states, "In order to encourage transit usage, Regional Transit will continue to support high density developments and the location of major employment centers along transit corridors and adjacent to light rail stations, reduced parking availability and higher parking costs, transit subsidies provided by employers as an employee benefit and development design that enhances and does not conflict with transit operations..."

Local zoning policy offering highest density near transit stations is first in that strategy, but languishing downtowns and stations surrounded by poverty will need further incentives to attract investment, jobs and residents.

"Strengthen the planning, programming, and project prioritization role of Metropolitan Planning Organizations."

U.S. Department of Transportation, "A Statement of National Transportation Policy," February 1990.

Protection of suburban-rural open space and charging drivers for the real cost of their peak-period trips and parking would begin to turn attention back to city downtowns and suburban centers accessible to city residents.

Heightened attention to the social problems of the country, which are perceived to take place largely in cities, would also bring more development to places that public transit can efficiently serve.

The goal is not just replacing bus with rail when it promises to provide long-term benefits. It is creating compact attractive cities and activity centers. The thesis is that now more Americans would like this kind of environment and that the nation would greatly benefit from an expansion of energy-conserving and culturally stimulating cities and urban environments.

"In the final analysis, it's the proximity of transit to housing that counts."

Michael Bernick, Board Member, BART in *The San Francisco Chronicle*, March 19, 1991.

## Finance

Financing rail transit investments remains perhaps the most critical element in the entire equation. If adequate funding is not available, the potential of rail transit can never be realized.

The nation has suffered chronic underinvestment in all forms of infrastructure for over two decades. In public transportation, investment by the federal government fell 50% from 1981 to 1990, adjusted for inflation. Federal transit investment, now at $3.2 billion annually, would have to be raised to $6.5 billion just to restore federal funding to the levels provided in the early 1980s.

The American Public Transit Association has estimated that a federal transit investment of $ll billion per year will be necessary to provide the range of services to accommodate the same level of per capita transit use now being experienced in Canada. A modest but reasonable goal.

A significant share of increased federal support would be required to underwrite any significant expansion of rail transit in America.

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**If adequate funding is not available, the potential of rail transit can never be realized.**

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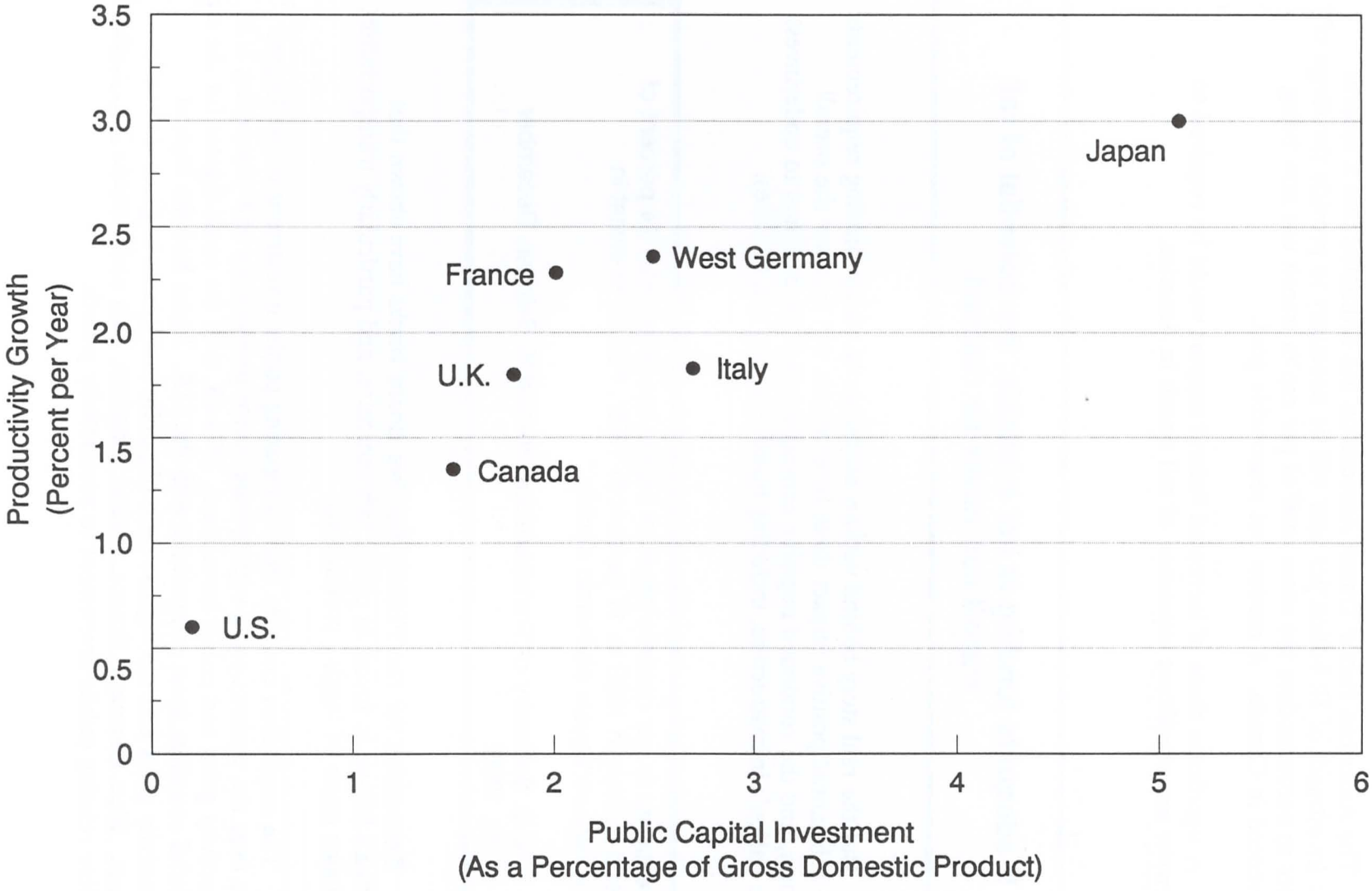
But the real story behind various estimates of transit funding requirements is the substantial positive impact these investments will have on the overall economy, and the continued negative consequences if we continue to underinvest in the nation's infrastructure, including transit systems and facilities.

> "Investment in our nation's physical capital has fallen from 24 percent of federal outlays in 1960 to 11 percent in 1990...Failure to invest in infrastructure equals economic decline."
>
> U.S. Secretary of Transportation Samuel K. Skinner, December 10, 1990.

Economists for two Federal Reserve Board Banks have shown that America's failure to invest in public infrastructure, and particularly transportation, is a major cause of lagging productivity.

The conclusion emerges from comparing public investment in the United States over the postwar years with private sector productivity and comparing U.S. productivity gains and public investment, 1973-85, with the same figures for the six industrial countries most competitive with the U.S. Japan had the highest productivity gains and the highest ratio of public investment to gross domestic product. West Germany, France, United Kingdom, Italy and Canada fell roughly in a line relating public investment to productivity growth.

## Higher Public Investment Implies Higher Productivity




Source: David Alan Aschauer, *Public Investment and Private Sector Growth* , Economic Policy Institute, 1990.

"Inadequate government infrastructure can impede improvements in productivity growth."

Michael Boskin, Chairman, President's Council of Economic Advisors, 1990.

Also, public capital investment "strongly influences the net returns to private capital." Nationally, Dr. David A. Aschauer of the Chicago Federal Reserve Bank found, a 1% rise in public capital stock results in a .1% rise in private investment return. Alicia Munnell of the Boston Federal Reserve Bank found that state and local public capital investment stimulates private investment.

In this period of low U.S. productivity, intense international competition and what may be a short period with available labor, investing more national resources in public transportation seems well advised.

This is not simply a statistical phenomenon. The federal government estimates that delays on urban highways totalled more than two billion hours in 1988, wasting 1.4 billion gallons of gas and costing travellers over $9 billion in time and other costs.

-- The U.S. also estimates that congestion delays cost around $7.6 billion to truckers.

-- A U.S. General Accounting Office survey of business leaders in 13 metropolitan areas found that half felt that traffic reduced their business's productivity.

Meanwhile, government investment in transportation is about half what it was in the early 1960s as a percent of gross national product.

"Using federal highway funds for toll road construction and mass transit could lead to more efficient ways of attacking congestion."

U.S. Secretary of Transportation Samuel K. Skinner, December 10, 1990.

Funds for research as well as new construction are important to improve ridership forecasting, value engineering and the land use-transportation relationship. There are several examples of new procedures and technology saving substantial sums. For example, some of the recent rail systems have remarkably lower costs than other systems.

Automation is working well on several systems. It offers the promise of lower costs over the long run as the U.S. labor force dwindles compared to projected jobs. In addition, automation promises much more frequent service throughout the day than manually operated systems can offer.

> "It is Federal transportation policy to:
>
> Increase the Federal transportation budget for research and technology projects..."
>
> U.S. Department of Transportation "A Statement of National Transportation Policy," February 1990.

The potential for better use of new technology as well as better management methods was spotlighted in a 1987 Transportation Research Board report of its Committee for Strategic Transportation Research Study for Transit, which called for more investment in research. The U.S. Department of Transportation (USDOT) provides research funds equal to only about .1 percent of public transit revenue. Typically, private industry spends 2.8 percent of revenue on research.

# VII

# ACTION AGENDA

There is growing recognition that congestion in metropolitan areas has become a major impediment to economic efficiency and good living. At the same time, there is widespread satisfaction with urban rail transit across the country. Nevertheless, there are mounting obstacles to expanding urban rail.

The nation needs:

## A. New Basic Values

1. A national policy aimed at increasing the efficiency and environmental quality of metropolitan areas--where the major economic thrust of the nation will take place. This would be equivalent to the long-range vision that gave the nation the Interstate Highway program, which vastly improved national transportation efficiency.

2. A national policy to preserve mobility of those who cannot drive--the old, young, disabled and poor. Activities increasingly spread through the countryside are off-limits to them. About 40% of Americans cannot drive but could get around on public transit based on extrapolation of a New Jersey estimate. The requirements of the Americans with Disabilities Act of 1990 must be financed as part of such a policy commitment.

3. Much closer relationship of land-use patterns to transportation investment. This requires:

   -- A broader basis for the federal government to evaluate transportation proposals. For example, urban rail has demonstrated its value in shaping growth for efficiency and environmental quality. Evaluation by the federal government puts little emphasis on these goals, tending to focus on short-term operational characteristics.

   -- A longer-term view of public transit investment by federal and state governments. Effective rail service requires a system, not just a line, but decisions now are made line by line with little consideration of how they will fit together.

-- Close collaboration of public transit agencies with land-use planning agencies. Frequently, public transportation goals have been thwarted by zoning that prohibited appropriate use of land around stations or by agencies that promote auto congestion in high-density areas by under-pricing parking spaces.

-- More emphasis on regional planning as urbanization spills farther and farther from city centers.

## B. Substantially Greater Investment

1. More funds for public transit. Studies showing that America's lagging private sector productivity is related to lagging public investment in infrastructure, including transportation, indicate this is essential. Within the transportation sector, rail deserves a much larger share in metropolitan areas, where highways are less successful in moving people efficiently. In the 1980s, however, federal transportation investment went down in constant dollars and public transit's share was drastically reduced.

2. Greater long-range certainty of capital investment in transportation. Private investors and land-use planners must have reasonable expectations that transportation will be available when promised. A dedicated fund may be necessary.

3. Reduced public subsidies for driving. A recent worldwide study demonstrates that the higher the cost of driving, the more people choose public transit. Yet driving is subsidized in the U.S.:

   -- Fewer than 10% of American employees pay for parking, and the expense is deducted from business income taxes. The value of their parking was placed by four different early 1980s studies between $12 and $50 billion a year, according to Worldwatch Institute Senior Researcher Marcia D. Lowe (October 1990). Ms. Lowe also reported that among workers in Los Angeles' Civic Center, those who would have to pay for parking were 44% less likely to drive alone than those who got free parking and 175% more likely to use public transit to work. Also, when employees of the Canadian government were first charged for parking, use of public transit increased 16%, driving alone decreased 21%. Much

of the cost of police relates to autos and almost always is paid from general taxes. In metropolitan areas, public transit carries the expensive peak-period extra loads; carrying peak-period travel in autos would be prohibitively expensive.

-- Lost time due to congestion costs travellers--and the environment--billions of dollars. Charging those who absolutely must drive during peak periods the real cost of delay and of environmental degradation would increase efficiency, use the principles of free enterprise to ration the scarce commodity of highway space and so give people more choice, and provide more funds to improve alternative transportation, i.e., public transit and ride-pools.

-- A 1985 U.S. Department of Transportation Study indicated $16 billion was paid by governments for road construction out of general revenues, a motorist subsidy.

4. Even-handed federal transportation financing formulas balancing highways and public transit.

## C. New Intergovernmental Relationships And Processes

1. More cooperation among agencies responsible for related programs--departments of transportation, environmental protection agencies and planning and development agencies at all levels of government. The proposed broad policies--A.1 and A.2--will help this coordination without adding approval delays.