GOVERNMENT AFFAIRS



Transportation

A TOOLKIT FOR REALTORS®

Second Edition



NATIONAL ASSOCIATION OF REALTORS®

The Voice For Real Estate®

REALTOR®

Real Strength.
Real Advantages.

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Foreword: An Updated Edition For Today's Challenges

A lot has changed since the first *Transportation Toolkit* was published in 2004. Since we at the National Association of REALTORS® believe that transportation is an issue of vital importance to real estate and communities, we thought it was time to update our members on the new challenges, issues, and concepts in the field.

For one thing, when fuel prices spiked in the summer of 2008, people started driving less. For the first time since the Second World War, the number of miles that Americans drove actually declined from the previous year. Fuel prices moderated in the fall of 2008, but the country slid into a sharp economic recession and driving has still not increased.

Meanwhile transit use is skyrocketing—in 2008 it reached its highest level in 52 years, according to the American Public Transportation Association. In the face of a faltering economy, rising unemployment, and falling gas prices, the number of transit trips rose 4 percent between 2007 and 2008, to a total of 10.7 billion. Unfortunately, at just the time that transit demand is surging, the recession is killing transit agencies' revenue streams, leaving them with massive budget problems and forcing them to cut back their services.

Another major set of changes concerns the policies of the federal government. The federal government has adopted policies to improve fuel economy and reduce dependence on foreign oil (e.g., "cash for clunkers"). Perversely, these policies may have the effect of reducing the revenues available for transportation. The chief source of revenue for transportation infrastructure is the tax on gasoline we pay at the pump. That tax has been bringing in less and less money as vehicle fuel efficiency has increased, the amount of driving has plateaued, and use of alternative-fuel vehicles and hybrids has increased. Today the Highway Trust Fund, which pays for federal transportation programs, is essentially bankrupt. Unless and until the political will is found to either increase the gas tax, find new sources of funds, or both, it will continue to require large infusions of general fund revenues.

In addition, federal transportation programs must now search for a new political rationale. The Highway Trust Fund was established 55 years ago to build the Interstate Highway System. As the interstate system is now complete, the federal role and mission in transportation needs to be clearly defined in order to justify continued expenditure of tax dollars. Taxpayers and transportation users will expect greater accountability and tangible value for each dollar spent.

Finally, even as recently as 2004, the issues of climate change and greenhouse gases were only small parts of the transportation policy discussion. Today, for a host of reasons, they are a central part of the debate over the future of transportation infrastructure. The transportation sector, which accounts for approximately a third of greenhouse gas emissions in the United States, will be expected to do its part to achieve reduction targets.

This *Transportation Toolkit* contains a series of concise papers on these topics and more. We will add, update, or remove papers from time to time to keep this resource timely. In addition, we have included a glossary of transportation terms, FAQs, and NAR's official statement of policy. We hope you will find it not merely informative but useful for advocacy in your own community.

The Importance of Transportation to Real Estate and Communities

Why is transportation important to real estate and communities?

As any REALTOR® can tell you, transportation figures prominently in most housing decisions. Buying a house isn't just about a structure and a lot, it's also about becoming connected to a place. In the back of every potential homebuyer's mind, there's a series of calculations always going on: How long will my commute be? How far am I from where I'm going to shop? How congested are the roads here? How close are the nearest hiking trails? How will my kids get to school?

Savvy homebuyers even look to the future, keeping in mind that planned transportation changes can affect a property's value over time. Will the rail transit station that's expected to open down the street add value to my home? How about the cross-county connector that local officials have been talking about building for the last seven years?

But there's yet another level on which transportation is important to real estate: Transportation provides access to employment, and employment is what allows people to buy homes. A sound transportation system creates the foundation for a community's long-term economic well-being.

The Larger Stakes

Robert Fishman, a University of Michigan architecture professor, once asked 150 leading urban specialists to rank the top ten influences on the American metropolis during the past 50 years. What topped their list? The interstate highway system and the dominance of the automobile. Looking into their crystal balls, these urban experts predicted that transportation will play an equally large role over the next 50 years. Of course, whether the effect will be good or bad is still unknown. Clearly, the outcome will depend on our ability to make wise policy choices.

REALTORS® have a major stake in these issues. The biggest complaint from homeowners and homebuyers today is traffic congestion, a malady found wherever sprawl and rapid population growth combine with an unbalanced transportation system.

These three elements can start a vicious cycle, producing more and more congestion over longer stretches of road—a situation that becomes even more costly to deal with over time. The final result can be an exodus of investment from local neighborhoods and a decline in real estate values.

But shrinking real estate value isn't the only reason REALTORS® have a stake in these issues. In order to get a handle on growth, some state and local governments have been pursuing "concurrency" regulations—basically prohibiting any development unless the infrastructure (including transportation infrastructure) is already in place. At the federal level, the Clean Air Act (CAA) can jeopardize a community's develop-

ment plans if vehicle emissions associated with its long-range transportation plan exceed its pollution "budget." And this isn't an idle threat. In Atlanta, federal highway funds were cut off for a period in the late 1990s due to a "conformity lapse" with CAA requirements.

But transportation doesn't have to be only a negative consideration. Incorporated correctly, it can be a tool for better communities and a higher quality of life. There are transportation projects, for example, that improve air quality, bring affordable housing closer to job opportunities, and expand access to suburban employment centers. Want to create more vibrant urban centers or counteract a loss of open space? Transportation projects can help with those things as well. Transportation can even be an aid to home ownership if it reduces transportation costs and frees up more income for putting together a down payment and sustaining a monthly mortgage payment.

The bottom line: transportation can be a constructive force in building quality communities. It all comes down to choices. And that's where REALTORS® fit in. By being intimately involved in their communities, REALTORS® can put forward practical ideas about how transportation can be improved in a way that balances all of the factors critical for a healthy community, including housing, economic development, and jobs. However, as in any discipline, to be an effective advocate one has to be conversant in the issues and knowledgeable about the state-of-the-art solutions.

That's what this Toolkit is designed to do—to give REALTORS® a grounding in the current challenges to mobility, especially congestion, and a working familiarity with the latest transportation concepts such as congestion pricing, HOT lanes, bus rapid transit, transit-oriented development, walkable neighborhoods, and more.

Real estate of all types flourishes best in livable communities with efficient systems of transportation. NAR's goal is to make sure REALTORS® have all the tools they need to foster a positive nexus between housing and transportation—one that truly promotes quality in the community and in the lives of residents.

Survey Reveals That the Public Wants More Options for Mass Transportation

The 2009 Growth and Transportation Survey, sponsored by the National Association of REALTORS® and Transportation America, asked Americans how their communities are handling development, how development affects them, and how the transportation needs of communities can best be met. Respondents favored increased investment in bus and rail systems and policies to encourage denser development over building new roads as priorities for federal and local governments facing challenges of economic stagnation, population growth, and traffic congestion.

Growth and Transportation Nationwide

America's population is expected to increase 100 million by 2050. To accommodate this growth, Americans favor restoring existing roads and bridges and expanding transportation options, improving intercity rail and transit, and making it easier to walk and bike. Three out of four favor improving rail systems to handle future growth rather than building new highways and freeways.

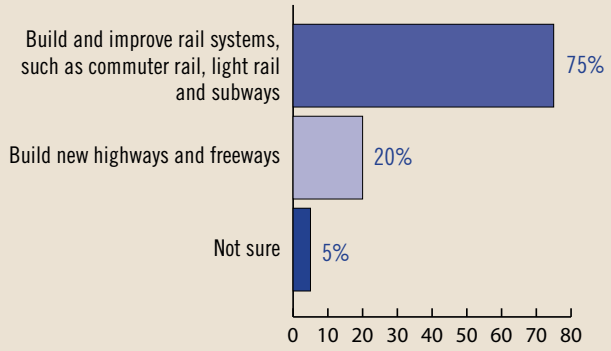
Half of U.S. citizens believe that maintaining and repairing roads, highways, freeways and bridges should be the top priority as the federal government makes its plans for transportation funding in 2009. Just under a third (31 percent) believe the top priority should be expanding and improving bus, rail, and other public transportation, and only 16 percent believe it should be expanding roads, highways, freeways and bridges.

What citizens want or need and what they get are two different stories. When asked which one or two types of transportation are not getting enough attention from the federal government, more than half (56 percent) responded trains or light rail systems and nearly half (48 percent) responded roads and buses.

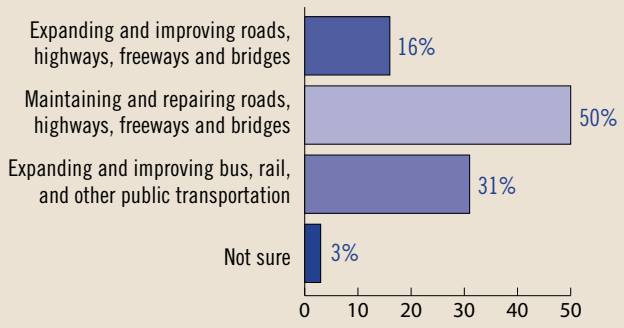
Transportation Policy at the Local Level

Almost two-thirds of Americans believe their communities do a good or excellent job providing parks and protecting

Given that the U.S. population will increase by one hundred million people by 2050, which of the following transportation approaches do you prefer to accommodate this growth?



As the federal government makes its plans for transportation funding in 2009, which one of the following should be the top priority?



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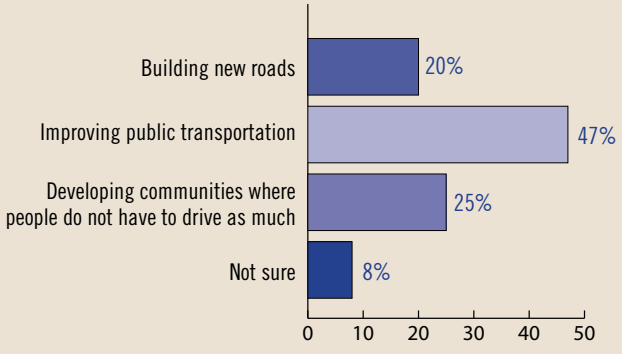
open space (65 percent), and more than half believe their communities do a good or excellent job providing good public schools (58 percent). When it comes to transportation, however, a majority of those surveyed think their communities do a poor or only fair job.

For instance, 56 percent think their community is doing a fair or poor job managing growth and new development. Only 7 percent believe their community is doing an excellent job providing practical and convenient public transportation.

When it comes to traffic congestion in their communities, two-thirds (67 percent) want to address the problem with improved public transportation, including trains and buses, and more options for walking and biking, while only a quarter (27 percent) want more roads built and existing roads expanded. When asked about the best long-term solution for reducing traffic, almost half (47 percent) preferred improving public transportation. A quarter chose building communities that encourage people not to drive as much, and 20 percent preferred building new roads.

Which of the following proposals is the best long-term solution to reducing traffic in your area?



More people agreed than disagreed that new home construction should be limited in outlying areas and encouraged in already developed areas, and that businesses and homes should be built closer together so that stores and restaurants are within walking distance and do not require the use of an automobile.

The Economic Stimulus Package and Long-Term Economic Growth Priorities

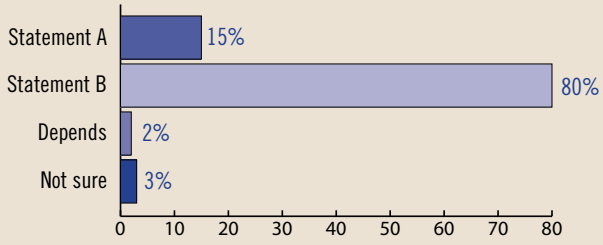
Overwhelmingly, Americans agreed that transportation- and infrastructure-related projects should be included in the economic stimulus package through job creation initiatives. Most wanted highway and bridge repair projects (93 percent), alternative energies such as wind and solar power (86 percent), the development and improvement of public transportation (83 percent), and developing and expanding parks that preserve green space and recreation areas in communities (71 percent) to be included.

Respondents also agreed that economic stimulus activities should be less focused on immediate needs and more on long-term economic growth. Specifically, 80 percent of Americans want transportation and other infrastructure spending included in the economic stimulus bill to go to projects that achieve multiple goals including creating new jobs, improving the environment, increasing transportation choices, and reducing dependence on foreign oil, even if it means jobs are created over a longer period of time. The top transportation-related goal in respondents' eyes is promoting long-term economic growth (41 percent).

I'm going to read you two statements, and I'd like you to tell me which one comes closer to your point of view.

A: Transportation and other infrastructure spending should only include projects that can be started right away, such as traditional highway and bridge construction, to create new jobs and provide an immediate boost to the economy.

B: Transportation and other infrastructure spending should be targeted specifically to projects that achieve multiple goals, including creating new jobs, reducing dependence on foreign oil, improving the environment, and increasing transportation choices, even if the jobs are created over a longer period of time.



In addition, 89 percent want transportation investments to support the goal of reducing energy use, with 58 percent wanting that strongly. Three in four also want the stimulus plan to support the reduction of carbon emissions that lead to global warming and climate change.

The 2009 Growth and Transportation Survey was conducted by Hart Research Associates, January 5–7. Hart Research Associates telephoned 1,005 adults living in the United States. The study has a margin of error of plus or minus 3.1 percentage points. The entire survey can be viewed at www.realtor.org/smartgrowth.

Fast-Growing Light Rail Adds to Transportation Choices and Can Stimulate Local Economies

Light rail systems are trains that are lighter and shorter than commuter rail or heavy rail systems. Although light rail represents only a small portion of the public transportation market, it is the fastest growing mode of public transportation and has been shown to provide a significant stimulus to surrounding economies. But the recession is slowing light rail expansion plans and forcing service cutbacks and fare hikes.

The term "light rail" is commonly applied to trains that operate on rights-of-way off the streets or on urban-area streets, have several cars, and are lighter and shorter than commuter rail trains or heavy rail systems. There is generally some distance between light rail stations, perhaps as much as a mile, except in urban centers. Streetcars, also known as trolleys, usually share city streets with cars, trucks and buses, have one or two cars and stop every few blocks. In most cases, light rail and streetcars run on electricity delivered by overhead power lines.

In 1981, the first light rail system in the United States opened in San Diego. Nearly 30 years later, 34 light rail systems are serving communities from coast to coast. Many of them are involved in major expansions of their lines, and three dozen more communities are in various stages of planning and developing light rail.

Light rail and streetcars (including trolleys) still comprise a small part of the public transportation market across the country: light rail ridership accounted for less than 1 percent of total transit trips last year, much less than major public transit modes like buses or commuter rail. Most Americans, meanwhile, still hop in their cars to commute to work, go shopping, take in a movie or haul the kids to soccer practice.

The transportation environment is changing rapidly, however. Light rail's success is leading transportation planners and local government officials across the country to propose new systems for their communities, and light rail is now growing faster than other modes. The American Public Transportation Association (APTA) reported that light rail and streetcar ridership increased by 8.3 percent in 2008, highest among all modes of public transportation. Total ridership for the year was 465.1 million. APTA reported double-digit increases in light rail ridership last year in Charlotte, Buffalo, Philadelphia, Sacramento, Baltimore, Minneapolis, Salt Lake City, New Jersey, Denver, and Dallas. Denver is already exceeding its ridership projections for 2020.

The newest light rail system in the United States is Sound Transit's 15.6-mile Central Link in Seattle, which opened in July 2009. Nearly 62 percent of the voters approved an extension of Seattle's system in the 2008 election. Before that the latest was the METRO in sprawling, congested Phoenix. Prior to the launch of the METRO in December 2008, Phoenix, the fifth-largest American city, was the largest with no passenger rail service of any kind. Amtrak didn't even stop there. In the first two days of operation, 200,000 rail-starved people rode METRO's 20-mile starter line.

A Boost to Local Economies

Light rail has proven to be a major stimulus to the economies of communities that have built new systems in recent years. Transit-oriented development (TOD) is built into the planning for some systems, but is not a consistent factor in the growth of light rail. (See "Developers Are Building More Walkable Neighborhoods Around Transit Systems.")

"Transit-oriented" refers to developments clustered around transit stations with amenities designed for safe, convenient use by pedestrians. One agency that actively promoted TOD was Dallas Area Rapid Transit (DART), which currently operates two lines on 45 miles of track in Dallas and its suburbs and is planning to add a third, 28-mile line by December 2010.

In November 2007, the Center for Economic Development and Research at the University of North Texas issued a report on the potential fiscal impacts of TOD in the DART service

area. The report came to this startling conclusion: "The total value of projects that are attributable to the presence of a DART Rail station since 1999 is $4.26 billion." The study reported that homes near rail stations increased in value by 39 percent more than homes not served by light rail.

In Charlotte, transit officials say that more than $291 million in new development has been built near stations on a 10-mile rail line that opened last year, with an additional $1.6 billion in development to come. Denver transit officials say 11,000 residential units and 8.4 million square feet of new retail, office, and government space have been built along its existing 35-mile rail network. A U.S. Department of Commerce model estimates that the University Link, a 3.7-mile connection from downtown Seattle to the University of Washington, will generate economic activity equivalent to 22,800 jobs.

The Cost Factor

Even as light rail is growing in popularity and ridership, however, the global recession is creating funding issues that could put expansion plans on hold, or scale them back, until the economy recovers. Many systems are considering fare increases, service cuts, and layoffs.

Light rail construction is financed largely by local tax increases and federal construction grants with other federal, state, and local funds added into the mix. Fares comprise a small portion of revenue—for example, just 19 percent of operating expenses for Denver's Regional Transportation District (RTD).

"It's not a money-making proposition," says Matt Cohen, a Denver REALTOR® who serves on the RTD Board. "It's not going to pay for itself in the present model."

"We're always seeking federal grant sources," RTD General Manager Cal Marsella says. "We've cut costs here in every way we can. We're always looking at the state budget. So the only place you can look to really is federal grants, if they're there, and raising the sales tax."

But the sales tax increases approved by local voters in referendums are producing less revenue because of the recession.

Charlotte's LYNX light rail system is funded in part with a half-cent sales tax approved by voters in 1998 with 57 percent of the vote. Last year, 70 percent of the voters rejected a ballot issue pushed by light rail opponents to repeal the sales tax. Yet even so, LYNX's shortfall has been projected at $260 million over 10 years.

The federal government has provided major support for construction of light rail systems, coming up with 50 percent of the cost in many instances. Art Guzzetti, vice president of policy at APTA, notes, however, that the federal government pays 80 percent of the cost of highway construction. He says federal support has been increasing, but the government needs to do a lot more.

"I would look at it another way and say they have been underfunding," says Guzzetti. "There are a lot of good projects out there, and there should be a higher level of investment."

The federal economic stimulus plan will help, providing $1 billion in capital investment grants for light rail, heavy rail, commuter rail, and high-occupancy vehicle projects. Phoenix, New Jersey, and Charlotte have already received light rail stimulus grants.

Case Study: Denver

Of all the cities where light rail is winning public transportation converts and pulling people out of their cars, none has bigger ambitions than Denver. The RTD, the regional transportation agency that serves the Mile High City and all or part of eight adjacent counties, is planning to expand its existing 34-mile light rail system to 122 miles by 2017.

Unfortunately, the cost of the expansion is pegged at $6.9 billion—$2.3 billion more than voters were told it would be in 2004 when they passed, for the second time, a sales tax increase to help pay for light rail. Denver residents and visitors now pay a 1 percent sales tax to support light rail.

A majority of the 15 members of the RTD Board of Directors favor asking the voters to double the portion of the sales tax dedicated to the FasTracks expansion, as the proposed system is called, to eight-tenths of a percent.

"The consensus was, essentially, we will vote to ask the voters for a tax increase, but we don't know whether it will be in 2009 or 2010," says Cohen. "The best case scenario is the voters will approve a four-tenths of one percent increase in the FasTracks sales tax, and the feds will approve $1 billion in funding as we explore public-private partnerships. If the tax is approved and the feds approve $1 billion in funding, we build out the system by 2017."

Without the additional local and federal funding, it will likely take until 2034 to complete FasTracks. As this goes to print the board has not decided when it will vote on taking the tax increase to the voters.

Bus Rapid Transit Offers a Fast, Low-Cost Alternative

With Americans seeking out new forms of transportation in congested urban areas, Bus Rapid Transit (BRT) is emerging as a relatively low-cost alternative. The 25 BRT systems now in operation across the United States vary considerably, but most share characteristics such as dedicated lanes, larger capacities than regular buses, faster trips, and more rail-like stations. Although new BRT systems in places like Boston and Eugene, Oregon, have proved highly popular, some opponents contend that light rail systems are generally a better choice.

As any frequent driver knows all too well, American roadways are crowded. And with the population expected to increase 100 million by 2050, it's a problem that's only going to become more pressing. Nearly half of those surveyed in the 2009 Growth and Transportation survey, sponsored by the National Association of REALTORS® and Transportation for America, thought that improving public transit was the best way to cut down on local traffic. So communities from Puyallup, Washington, to Chicago to Bergen County, New Jersey, are turning to Bus Rapid Transit, an affordable, efficient alternative to intercity rail. Supporters say that Bus Rapid Transit, or BRT, can cut down on congestion while improving access to employment centers and cultural attractions.

Strictly defined, BRT has seven characteristics:

- Dedicated lanes on streets or highways
- Stations that go beyond bus shelters, with benches, lighting, ticket vending machines, and information on arrival times for the next buses
- Specialized, articulated buses that carry more passengers than regular buses
- Improved fare collection systems
- Advanced technology that allows vehicles to change upcoming traffic signals and provide real-time travel information to passengers
- Improved service such as faster trips and better reliability
- Branding and marketing, including special signs, distinctive logos, and colors for the buses and stations

Most of the 25 metropolitan areas across the United States with Bus Rapid Transit don't incorporate all seven features. Cities as varied in size as Los Angeles; Hartford, Connecticut; Charlotte, North Carolina; and Eugene, Oregon, operate BRT programs that conform to the needs of the area. Some systems are doing little more than calling a bus route BRT, while others meet several qualifications, such as running on a dedicated lane during peak traffic times and being able to affect traffic signals.

An elaborate BRT system can cost $300 million to $400 million. But even small changes that might cost as little as $1 to $2 million, such as upgrading bus shelters and running a bus that stops at every other stop, can make a difference, says Dennis Hinebaugh, director of the National Bus Rapid Transit Institute in Tampa, Florida. "Take the best route on your system and make it more rapid," he suggested.

Encouraging Beginnings

Early versions of Bus Rapid Transit date back several decades, but only in the past five to 10 years have communities around the United States engaged in earnest discussions to adopt these systems. Most have been implemented just in the past three years.

One model of a BRT system is the TransMilenio in Bogota, Colombia, launched in late 2000. According to a World Bank report, by early 2004 TransMilenio was running as many as 280 buses an hour in each direction and providing up to 900,000 passenger trips on an average weekday, or about 16 percent of the city's public transportation trips. According to TransMilenio, air pollution along its corridors decreased 40 percent in the system's first year of operation.

Courtesy of Dallas Area Rapid Transit

In the United States, Cleveland's Euclid Corridor Transportation Project is the newest full-scale BRT. Launched in fall 2008, the BRT, called the HealthLine System, uses 63-foot, hybrid diesel-electric, articulated buses that can hold as many as 111 passengers (seated and standing) and have two interior bicycle racks. The seven-mile route, through one of Cleveland's oldest areas, uses special median bus lanes and is being adorned with $1.2 million worth of public art. The corridor links downtown Cleveland to major hospitals and Case Western Reserve University, as well as to cultural attractions. Since the HealthLine System began running last October, ridership is up nearly 40 percent.

A Burgeoning Success in Eugene

It didn't take long for people in the Eugene and Springfield, Oregon, areas to take to their Bus Rapid Transit system. After 12 years of community discussion and planning, the Emerald Express, or EmX, debuted in January 2007, replacing what had been a regular bus line. Before the EmX, the route drew 2,700 boardings per day; now, it averages 6,000, says Andy Vobora, director of service planning, accessibility and marketing for the Lane Transit District, which runs the service. "Our projection was a 40 percent increase in ridership over a 20-year period. So we're pleased with that," he said. So far, the service has been free, but fares will begin this summer.

The EmX's four-mile route connects downtown Eugene with downtown Springfield and uses the same type of elongated buses that Cleveland's system has adopted. It also has median bus lanes separated from traffic, median transit stations, and signal priority. "We tried to create, probably, the most extensive BRT system around, in terms of amenities. We were trying to emulate light rail," Vobora says.

EmX stations are one-third to one-half a mile apart, which means there are fewer stops than with a regular bus. People have to walk a little farther, which may be more difficult for older or disabled passengers, but few have voiced concerns, according to Vobora. One benefit is faster travel time. The regular bus traversed the route in 22 minutes while the EmX takes 16 minutes or less.

Skeptics may ask if it was worth spending $24 million to create the four-mile EmX stretch just to save six minutes. Vobora's reply: "Even that is pretty significant in terms of operational cost savings." In other words, fewer buses are needed to provide the same service. And the real impact will be felt when a 7.5-mile, $41 million extension opens in 2010.

Eugene's EmX quickly drew recognition from around the United States. The BRT system received an Honorable Mention from the 2008 Sustainable Transport Awards, sponsored by the Institute for Transportation and Development Policy in New York. Eugene was the only United States city nominated for the awards, whose top honors went to London and Paris.

Boston's Popular Silver Line

In the Boston area, traffic is often an issue because the streets are former cow paths and were never laid out in a grid formation like most other big cities, says Gregory Vasil, chief executive officer of the Greater Boston Real Estate Board. "Our members were seeing… a number of people that were looking for homes very close to public transportation nodes—commuter rail, subway, or bus routes. Traffic is a nightmare, and people would rather take public transportation than drive," Vasil said.

It makes sense, then, that Boston's Silver Line also has been popular with passengers. Skirting Boston's waterfront and extending to Logan Airport, the Silver Line opened in 2005 and has become the busiest of the 185 bus routes operated by the Massachusetts Bay Transportation Authority (MBTA). On a

typical weekday, the Silver Line has 14,200 boardings compared to 800 to 13,000 a day on the other bus routes.

The Silver Line is just one part of a massive transit system in the Boston area that also includes light rail and subways. Joe Pesaturo, director of communications, notes when planning was underway, some people thought the Silver Line should be a light rail or trolley system, but the cost would have been substantially higher. "And trolleys still compete with traffic," he says. "All it takes is one car, one accident and trolleys have to come to a stop." A bus can veer around a crash scene and keep going.

BRT vs. Light Rail

Opponents say Bus Rapid Transit doesn't measure up to light rail when it comes to long-term labor costs, fuel use, or economic development. "You can't make a bus into a train and that's what's been promoted," said Dave Dobbs, publisher of LightRailNow.org, based in Austin, Texas.

A study by the California Center for Innovative Transportation showed the Orange Line, a BRT route that travels from the end of a subway line across the San Fernando Valley, has reduced traffic congestion on the parallel U.S. Highway 101 by 14 percent. Dobbs says he thinks the Orange Line probably could have been converted to light rail for a relatively small cost "and would carry even more people than it does today." According to Dobbs, about 50 United States cities either have light rail lines or are considering building them; France is building an electric-powered light rail system in every city of 100,000 or more. "Operational costs of light rail, over time, are much lower than a bus," Dobbs said. He said a study by LightRailNow.org shows energy consumption on a per-passenger-mile basis is lower with light rail than with cars or buses.

Dobbs also contends that Bus Rapid Transit does little to encourage economic development along its routes because bus routes are less permanent than rail lines and can be changed. "A bus tends to be an afterthought. Buses are followers whereas trains and rails are leaders," he says. "A bus stop can go anywhere it wants to go tomorrow."

Boston's Silver Line

Space constraints can also pose problems for BRT, where downtown streets in big cities may be narrow, says Aimee Gauthier, communications director for the Institute for Transportation Development Policy. "What we want is for [communities] to implement a good quality, customer-oriented mass transit system. Most cities can't afford to pay for light rail or heavy rail. But Bus Rapid Transit is not only affordable, you can also provide the same level of service and demand as rail."

The Federal Transportation Program: NAR Adopts a Policy Position

With the six-year federal transportation spending bill up for renewal this year, major changes could be in the offing. For the first time ever Congress is entering this reauthorization debate with its main repository of federal transportation funds, the Highway Trust Fund, insolvent. At the same time America is changing demographically and socially, leading to shifts in the kinds of transportation options that people want. Congress will have to meet these new needs and find new sources of funding. Because these issues affect community livability so much, for the first time the National Association of REALTORS® has adopted a detailed policy position on the reauthorization of the federal bill.

Every few generations, innovations in transportation spur a revolution in how people and goods move around, with profound implications for how and where we build our cities and towns, and ultimately, how we live. In 2009 the federal transportation law is up for reauthorization, and in the face of a population dissatisfied with our current car-based transportation system, it may be time for some big steps. In the last year, two Congressionally-appointed commissions, key members of Congress, road builders, the U.S. Chamber of Commerce and large advocacy coalitions such as Transportation for America all have declared the current program exhausted and in need of a major rethink. Many of those following the issue believe that this year may be a turning point akin to that of 50 years ago.

The Interstate Highway Act

In 1956, when gasoline was just 20 cents a gallon, President Eisenhower signed what came to be called the Interstate Highway Act, an ambitious program that linked America's cities and states with a network of long-distance superhighways. Faced with what seemed like a never-ending demand for automobile travel, the government created policies that accommodated and even promoted the growth of suburbs and sprawling car-dependent urban areas.

What worked 50 years ago, however, is causing major problems today. Volatile gas prices burden household budgets and roil the real estate market; spread-out metro areas require a car to reach services and jobs; older Americans and members of low-income communities find themselves increasingly isolated due to unreliable public transportation networks. Americans no longer live how—or where—they did 50 years ago, and future transportation policies will need to address the new needs of a changing population.

Shifts in Travel Needs

It is estimated that by 2030, one in four Americans will be 65 or older. As older Americans leave the work force, stop commuting and begin to restrict the hours and distances they travel from home, they generally drive less than the population as a whole. In the baby-boom era of car-oriented suburbs, half of all households had a mom, dad, and kids. Today that share has shrunk to less than a third, while the proportion of single-person households edged past it. Fewer soccer moms and dads shuttling the kids around also will mean fewer miles driven overall.

Another significant change from the 1950s is that 75 percent of Americans now live in metropolitan areas. The largest 100 metropolitan areas alone account for 65 percent of the population and 78 percent of economic activity. In coming years, the population is projected to become even more heavily concentrated in urban areas. The challenge these days is not so much getting between cities, or from farm to market, as traveling within increasingly crowded metro areas.

Americans' driving habits are also increasingly shaped by realities of climate and limited energy supply. As oil becomes less plentiful and more hotly contested in coming decades, reducing per-person consumption will be part of the nation's plan to insulate ourselves from volatile energy markets and potentially hostile oil-producing countries. Proposed mea-

sures to curb greenhouse gas emissions—whether a carbon tax or a cap-and-trade system—may also increase the cost of driving. Higher prices, in any event, will lead Americans to drive less, as they did when prices spiked dramatically last summer and fall.

A Changing Real Estate Market

These changes in travel patterns, demography, and cultural preferences are being reflected in an evolving real estate market, says Christopher Leinberger, a real estate consultant and developer, and the author of *The Option of Urbanism: Investing in a New American Dream.*

He notes that in the current, down market, properties on the exurban fringe with long commutes to job centers are languishing even at drastically reduced prices, while those closer to transit stations and employment concentrations are holding value. Recent high gas prices have exacerbated a trend away from places with long, expensive commutes, says Bob McNamara, senior policy representative with the National Association of REALTORS®.

"That 'drive 'til you qualify' idea was based on a calculus, and that calculus is broken, as many people are finding to their dismay," McNamara says. "Although gas prices have dropped recently, people are much more conscious of the cost of transportation."

"The market has begun to shift," Leinberger says. "For 50 years there was pent-up demand for drivable suburban product, and it was a new product. We had a very good run of that, but now the pendulum has swung. Today there is pent-up demand for another product we haven't addressed for decades—walkable urban."

Places designed to be "walkable" allow residents to meet many, or even all, daily needs within walking distance or by transit, according to Leinberger. Recently, the real estate Web site Zillow.com began posting walkability ratings for its listings, created by WalkScore.com, which bases the score on how many activities and services are located within walking distance.

"It's not that everyone wants walkable neighborhoods, but we clearly are not meeting the demand, and it's only going to grow," Leinberger says. Meeting that demand will require "a balanced transportation system: rail transit, walking, biking, as well as cars."

NAR's Position on Federal Transportation Policy

These transportation issues have begun to loom so large in the real estate and housing equation that, for the first time, NAR has adopted a detailed policy position on the reauthorization of the federal bill.

"The reauthorization legislation doesn't touch directly on real estate transactions, so there is not a direct stake," McNamara says. "The REALTORS®' interest in this stems from their interest in community livability, in smart growth, and—in looking at the polling we've done—the fact that housing consumers would like more options and different options. If we're successful in providing those options, communities will be more prosperous and more livable and that's got to be good for real estate."

In another first, the NAR also has joined a diverse coalition of nearly 300 national, state and local organizations with a stake in the federal transportation bill. The Transportation for America coalition (online at T4America.org) aims to represent the broad range of transportation system users, as distinct from the industry groups that usually follow the debate closely. The T4America coalition includes well-known organizations such as AARP, the American Public Health Association and the National Trust for Historic Preservation, as well as key groups with a focus on issues including rural and small town concerns, affordable housing, the environment, social equity, public transportation, bicycling, and walking. A number of elected officials and state and local entities are also involved.

Major Questions

James Corless, the director of T4America, says the big challenge for coming decades will be developing and funding a program to build "the second half" of the transportation system—the intercity trains, light rail and bus lines, and walking and biking infrastructure that have lagged over the years—while maintaining and maximizing the efficiency of existing highways, bridges, and transit lines. Such steps will make communities more livable, helping to address the pent-up demand for real estate with good access to transportation options. Some major policy questions include:

- How to meet the pent-up demand for public transit, particularly rail, rapid bus and streetcar projects, many of which have local funding but must wait years for their federal match;
- How to give metropolitan areas the latitude to solve their congestion and mobility issues, while holding them accountable for being fair and inclusive and making timely progress on national goals;
- How better to serve rural areas and small towns, which were especially hard hit when gas prices soared, and whose chronically underfunded bus and shuttle services leave many stranded;
- How finally to start to coordinate development and growth patterns with transportation investment, to ensure that people can find homes near jobs, that highways don't become overburdened by bad planning, and that we make the most of transit investments; and
- How to streamline the programs and delivery systems—the transport agencies at all levels who must implement the new vision—so that projects get built quickly, yet still according to smart planning.

And the biggie, of course: How to pay for it all.

"This is the first time we've gone into an authorization debate with the highway trust fund insolvent," notes John Horsley, executive director of AASHTO, the association of state departments of transportation. "Usually there have been reserves deep enough that congress could take its time and keep extending the existing law till they reached agreement." But even as the insolvency question adds to the urgency: "There is a desire by the White House and the Congressional leadership to make a transformational bill."

Horsley says he thinks Congress should debate a vision and establish funding authorizations at a level sufficient to fulfill it, an estimated half-trillion dollars (nearly double the current level), then work through the politics of actually raising the money in the next couple of years. The bill itself should encourage experimentation with new funding sources: charging a "vehicle-miles traveled" tax based on how much you drive, rather than how much fuel you buy; funding some rail transit projects by recapturing increased land values; charging "congestion tolls" for those driving at peak times; and plowing that money into providing alternative modes of travel in the same corridor.

Whatever the mechanism, Corless says, Americans are likely to pay if it results in giving them cleaner, smarter, cheaper, and more convenient options.

"In the end, you should still be able to choose to drive," he says, "but it shouldn't be your only option."

Transportation Costs Can Wipe Out Housing Savings for Far-Flung Suburbanites

For many years, families with lower incomes have moved farther from city centers to find affordable housing. But the recent spike in gas prices has brought national attention to the cost of transportation to and from these distant neighborhoods. Studies have shown that for some families, transportation costs can even exceed housing costs. New indices aim to elucidate the tradeoffs between these two sets of costs and help families find truly affordable places to live.

In the housing market, distance matters. As the odometer turns, house payments fall. That makes homes farther from city centers less expensive, but does it make them more affordable?

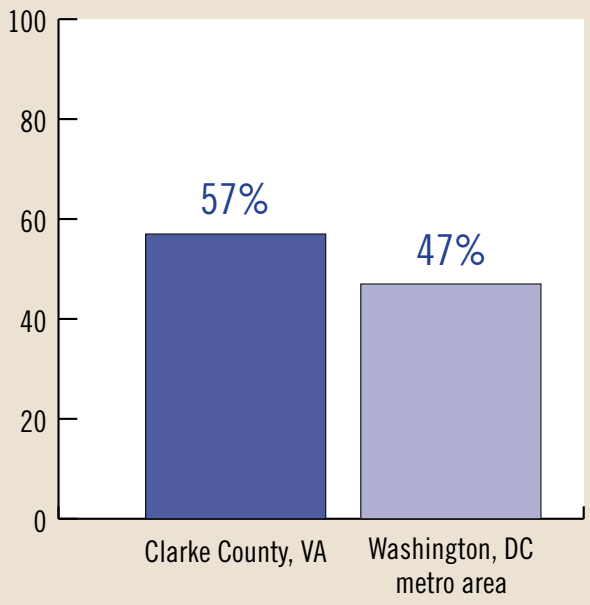
The raw cost of housing is not the only factor to consider when making a purchase. The farther one has to travel between home and work, the smaller the advantage of inexpensive housing. Recent studies have made it apparent that transportation is almost as large a factor as housing in calculating an area's true cost.

Two Studies

"Beltway Burden," a 2009 study of metropolitan Washington, D.C., uses Clarke County, VA as a startling example of the perils of ignoring transportation costs. Housing costs in Clarke County average $19,939 a year, considerably less than the average of $22,960 for the metropolitan area as a whole. Transportation costs for those living in Clarke County, however, average $17,090 a year, versus $13,234 for the metropolitan area. This disparity makes the combined cost of living in Clarke County higher than the metro average: $37,029 rather than $36,194.

That doesn't seem like such a big difference, until incomes are factored in. According to the study, the average D.C.-area household earns $78,221 a year, spending nearly 30 percent on housing and 17 percent on transportation. The average Clarke County household earns $64,288 a year, spending about the same share of its budget on housing (31 percent) but far more on transportation (26 percent). That means that despite Clarke County's relatively affordable housing costs, the combined cost of housing and transportation in Clarke County consumes a far greater share of the average household's budget (57 percent) than the metro area average (47 percent).

Share of household budget going towards housing and transportation



Similar findings emerged from a 2006 study by the Center for Housing Policy (CHP), the Center for Neighborhood Technology (CNT), and the Institute of Transportation at the University of California, Berkeley. That study, "A Heavy Load," examined the budgets of households earning between $20,000 and $50,000 in 28 different metropolitan areas. When compared to households of all incomes, these families spent the same percentage on housing (27.7 percent) but far more on transportation (29.6 percent versus 20.2 percent). "A Heavy Load" concluded: "In their search for lower cost housing, working families often locate far from their place of work, dramatically increasing their transportation costs and commute times. Indeed, for many such families their transportation costs exceed their housing costs."

Hidden Costs

Rising gas prices last year brought national attention to often unobtrusive transportation costs. Gloria Ohlman, the communications director at Reconnecting America, points out the reason transportation expenses are often overlooked: "Families pay for housing in monthly lump sums, either rent or mortgage, but they pay their transportation costs in bits and pieces. Who knows how much they spend on gas, repairs, insurance? It's all these disaggregated costs. I don't think people are very cognizant of how much they spend on transportation."

The Housing and Transportation Affordability Index (online at http://htaindex.cnt.org/) —developed by the Center for Transit-Oriented Development (CTOD) and CNT on behalf of The Brookings Institution—illuminates the tradeoff between housing and transportation in 42 cities across the country. The index adds average housing costs and average transportation costs and divides the total by average income. (Transportation costs are calculated using a model that takes into account density, walkability, and transit availability of individual neighborhoods.)

The Housing and Transportation Affordability Index concludes a family should spend no more than 47 percent of its income on housing and transportation. That figure is based on the national average expenditure of 19 percent for transportation plus the mortgage underwriting standard of 28 percent for housing. Using 47 percent as a benchmark, the index can tell families—and/or their REALTOR®—which neighborhoods are affordable based on a family's particular income.

Another set of such indices is under development by the U.S. Department of Transportation (DOT) and the Department of Housing and Urban Development (HUD). In the spring of 2009 the secretaries of those agencies announced they will collaborate to expand affordable housing and transportation choices. High on their agenda: helping metro areas develop indexes that roll housing and transportation costs into a single measure of affordability.

"This idea had no traction for a long time, and suddenly the Obama administration seems to be seeing the importance," Ohlman says. "I think this is the first time DOT and HUD have partnered on a project in something like 40 years."

Bringing Costs Down

People choose where to live based on more than simply cost of housing and length of commute, so for some, other factors are the ones that tip the scales. "It's a more complicated issue than just how much you're paying," says Jeffrey Lubell, executive director of CHP. "People also move because they want a bigger house, a safer neighborhood, better schools."

Fortunately, transportation cost is not purely correlated to distance from city centers. Mass transit can mitigate the otherwise steep price of a daily commute, and a healthy awareness of the cost of distance may be more valuable to the home-buying process than any binary imperative. As Lubell says, "Ultimately, it's about creating more walkable and transit-oriented communities where more of the things people need to do are closer together."

Developers Are Building More Walkable Neighborhoods Around Transit Systems

Responding to Americans' changing preferences, developers are helping transform the way cities grow with projects huddled near transit hubs. Such projects are increasingly popular, and are likely to become more so as concerns about climate change and gas prices continue to rise. They also have drawn support from the federal government. But in many ways they can be more challenging than traditional developments on virgin land.

Although some cities like New York and Chicago have long-entrenched public transit systems, in most places Americans' attachment to their cars made new public transit a hard sell for decades.

But attitudes are changing. Concerns about global warming and increasingly volatile gas prices have led to increased interest in environmentally friendly transportation. The weakened economy is forcing Americans to scrutinize every penny they spend on housing and commuting. And ever-worsening traffic gridlock may also be converting nonbelievers into transit evangelists. When asked the best approach to solving traffic problems, 47 percent of respondents to a 2009 National Association of REALTORS® and Transportation for America (online at T4America.org) poll favored improving public transportation, 25 percent preferred building communities that make it possible for people not to drive, and only 20 percent advocated building new roads.

Real Estate Development Follows Transit

Increasingly, this shift in attitudes is leading cities to build new public transit systems or expand their existing ones. "In Denver, voters agreed to tax themselves to pay for a regional light rail system," says Allison Brooks, managing director of Reconnecting America, an Oakland, California, nonprofit transit advocacy organization. "Minneapolis-St. Paul is investing in a new light rail system. In Los Angeles, voters approved a tax to pay for the expansion of the current system." Charlotte and Phoenix are also investing in transit.

Following close behind is real estate development clustered near light rail stations, at subway stations, and near streetcars—called transit-oriented development, or TOD. These are projects like the Lake Highlands Town Center in Dallas, a nearly 2-million-square-foot, mixed-use project that will include a Dallas Area Rapid Transit (DART) light rail station. "A growing number of developers really get transit-oriented development," says Jud Pankey, chief executive officer of Prescott Realty Group, which is building the Lake Highlands Town Center. "It's a whole new way of doing business."

"Transit-Oriented" vs. "Transit-Adjacent"

Transit-oriented development is not just any land use located adjacent to or near a rail station. To be "transit-oriented" the nearby land uses must be readily accessible to and from stations and must be designed for safe, convenient use by pedestrians. True TOD has an organic relationship with transit. It increases transit ridership and it directly benefits from high pedestrian activity levels associated with the transit line. Successful TOD districts generally display pronounced elements of "place" in the sense that people willingly spend time there (not just waiting for transit) and the district has a neighborhood name and is well-known to the area population as a destination.

The land use mix required to achieve these characteristics can vary depending on the transit mode and on the location of the station within the metropolitan area. Generally, at least three major land uses should be immediately present. Residential, retail, restaurant, and civic uses would represent a common TOD mix. Hotels, office buildings, and other places of employment may also be present.

There are many rail transit stations in the United States (including some in and around major cities) that have no significant organic relationship with their surrounding land uses. This is most common for suburban commuter rail stations that serve primarily to provide park-and-ride access to the transit line, but it can also be true of major employment cen-

ters served by a transit stop. In other cases, auto-oriented development patterns and infrastructure design have negated any land use benefit from the transit service. These sites are generally referred to as "transit-adjacent" and may represent a significant missed opportunity.

Transit-oriented districts are mainly located within a quarter to a half mile of a high-capacity transit station. This radius is related to pedestrian walking distances, since public transit most influences those land uses that can be reached on foot in five to ten minutes. It is important to note that the size of a TOD area can be larger or smaller than this depending on the quality of the walking environment and the presence or absence of significant barriers to walking.

A Growing Trend

Those who have mastered TOD say the phenomenon will only expand. "In five years, properties along transit routes will have increased in value because people will pay a premium to live where they can walk to a transit station, even if they're not using it every day," says Carl Dranoff, president of Dranoff Properties in Philadelphia. "Those will be the most sought-after locations." One of Dranoff's projects, a 163-unit condominium development in Philadelphia's cultural hub, is within steps of a subway entrance and the Kimmel Center for the Performing Arts. That project is now 90 percent sold. "We were able to hold our prices, and our fall-out ratio of people who cancelled contracts while waiting for their unit to be finished was only 7 percent," says Dranoff. "We were able to go against the grain because sales on projects near transit are better than those further away."

"I've been doing TOD since the late 1990s, and I continue to ask myself whether it's going to go away," says G.B. Arrington, vice president and principal practice leader for PB PlaceMaking, a Portland, Oregon, design and planning firm specializing in TOD. "But the interest and demand in both the public and private sectors continues to grow because developers who follow the principles of TOD will create places that are more resilient in the face of gas prices and climate change."

Federal Policy Support

Federal policymakers seem to agree. In March 2009, the U.S. Department of Housing and Urban Development (HUD) and the U.S. Department of Transportation (DOT) announced a joint "livable communities" initiative to help Americans gain better access to affordable housing, find transportation options, and lower their transportation costs. According to the two agencies, the average working American family spends nearly 60 percent of its budget on housing and transportation. They've united to cut those costs by creating affordable, sustainable communities that rely heavily on transit. DOT also announced $100 million in federal funding for transit projects that reduce energy consumption or greenhouse gases.

"In the last six months, we've seen national interest at the policy level that we haven't seen before," says Abby Thorne-Lyman, a principal at Strategic Economics, an economic and real estate consulting firm, and a staff member for the Center for Transit-Oriented Development, a nonprofit research and advocacy group in Berkeley, California. "It's become a national movement, not just of developers but also of policymakers realizing they have a role to play and that transit has large benefits in terms of greenhouse gas reduction and economic development."

Challenges

But even with increased federal support, TOD can be much more difficult and complex than development on virgin land. It can be difficult to assemble the necessary parcels, and the approval process can present a maze of zoning and permitting restrictions. "You've got multiple public entities and public constituencies to work with," says Pankey. "You have not only the transit authority, but other public improvements may also have to be done, and that could mean working with the city, county, and a tax increment financing (TIF) district. Those members represent various constituencies, and you have to be able to navigate that process and articulate the benefit of transit living."

Lenders often don't understand the large and intricate—and long-term—nature of TOD projects. Often a developer must borrow in order to acquire property and then hold that property until the transit service matures and the demand it brings can support the development. This means lenders, which often include public entities alongside private banks, must be willing to wait a long time.

Local residents may also lay down early opposition to higher-density developments. Not-in-my-backyard (NIMBY) concerns are nothing new to developers, but TOD presents added complications. Dan Johnson, deputy city manager and chief operating officer for Richardson, Texas, which is adding four stations to the DART rail line that runs through the city, says early planning is one way to avert NIMBY sentiments. "Several years before the rail was developed, we were active with our city council and speaking in public sessions," he says. "We were also selected by the Urban Land Institute for a panel study in which a task force of professionals conducted planning and visioning sessions. A lot of problems were circumvented by having that session early on."

Federal Stimulus Package Will Boost Intercity Rail Projects in Multiple States

At President Obama's request, Congress has appropriated more than $10 billion for the construction of new intercity rail lines. Economic studies suggest that these new trains could increase real estate values. California is the most likely state to receive federal funds, to help complete a high-speed rail corridor linking Sacramento to San Diego. Florida may receive funds for a route linking Tampa and Orlando. Texas, Virginia, Wisconsin, North Carolina, and Ohio are other possible grantees.

Early in 2009 Congress passed a stimulus package at President Obama's request that included $9.3 billion for the construction of new passenger train lines. The president followed that up with an additional budget request of $1 billion a year for the next five years. The 2009 Omnibus Appropriations Act includes $90 million in matching grants for intercity passenger rail travel.

The federal support could help the United States reduce its automobile dependence. Unlike other modern industrial countries like Japan or those in Europe, the country lacks a true high speed rail train. The $787 billion stimulus package included $1.3 billion for Amtrak and $8 billion for passenger train capital grants, including money to develop high speed rail in 11 corridors across the country.

Clear Benefits

In remarks to the National League of Cities this past spring, U.S. Transportation Secretary Ray LaHood stressed that the goal behind all the transportation money included in the stimulus bill was not only to create jobs but to help make communities more sustainable. "This effort not only puts people to work, it gets people to work in a way that moves us toward our long-term goals of energy security and more livable communities," said LaHood.

Indeed, economic studies done for a high speed rail project to link Sacramento to San Diego, by way of San Francisco and Los Angeles, suggest that the train would increase land value by facilitating denser development. A study of economic benefits in Los Angeles concludes that demand to be near these new intercity rail stations will lead to more commercial/residential infill developments, pushing up property values. Another study points out that the cities of Ontario and Riverside in Southern California are already looking to create transit-oriented business and housing developments in order to put customers, jobs, and retail outlets in close proximity to one another.

Advocates for passenger rail service stress that the stimulus package money won't suddenly create a network of bullet trains across the country. Instead, the money can be used by any train that achieves speeds of 110 mph, which is considerably less than ones already operating abroad.

"It's unprecedented but it will not do what people say it will do, which is run bullet trains," said Ross Capon, president of the National Association of Railroad Passengers.

The Federal Railroad Administration states that the idea is to provide service that is "time competitive" with both air and auto travel within 100 to 500 miles. But the FRA also states that it wants to hand out money to "ready-to-go" projects for which planning, environmental impact studies, and preliminary engineering activities have been completed.

California in the Lead

The state already the farthest along is California. Voters in that state approved a $9-billion bond referendum in November 2008 to help pay for an 800-mile high speed rail system that would traverse the state from Sacramento to San Diego. The referendum also included an additional $950 million to pay for urban, intercity, and commuter rail lines to link up with the high-speed trains. The state is already moving ahead with the first phase of the project, expected to link the Los Angeles-Anaheim area to San Francisco. Travel between San

A conceptual view of California's proposed high-speed rail.

Francisco and downtown Los Angeles would take roughly two and a half hours once the train starts running.

Judge Quentin Kopp, chairman of the California High Speed Rail Authority, said he is "confident" that his state can get a large share of the federal money because it is pressing ahead with a train capable of 200 mph. "I think it's wonderful and I'm reasonably confident of getting a substantial amount of allocated grants from that," Kopp said. "California is unique."

Kopp said that the state could finish sections of this first 520-mile phase by 2013, with an estimated completion date of 2018–2020. The entire $45-billion system is expected to be finished by 2025.

Capon agrees that these aggressive efforts place California far ahead of other states.

"Clearly they have done more for laying the foundation for true high speed rail," he said. "It could provide a significant boost to the California high speed project. The fact is that most of the other states are working on what we call incremental upgrades in conventional services."

Florida Another Likely Prospect

In 2004, then-Gov. Jeb Bush, concerned about the potential cost, led a charge to repeal a constitutional amendment which had mandated that Florida create a high speed rail system to tie its major cities together. Before the state's bullet train was axed by voters, the state had spent $30 million and pursued critical environmental studies for a route connecting Tampa to Orlando.

The Florida High Speed Rail Authority now anticipates that it could begin construction within the next two years, and the Florida Department of Transportation says it has federal grants in hand that could be used to finish the work needed to draw down stimulus money.

Other States Not Far Behind

California and Florida will not be alone in trying to land billions in federal assistance for passenger train travel.

- Texas wants to expand the rail corridor connecting Fort Worth, Houston, and San Antonio.
- Virginia and North Carolina have already done a lot of the groundwork on a route to link Charlotte and Raleigh, N.C., to Washington, D.C.
- Wisconsin wants to move ahead with trains that would link Milwaukee and Madison, and to improve the existing route from Chicago to Milwaukee.
- Ohio wants federal money to restart passenger rail service along the so-called "3C" corridor that would link the cities of Cleveland, Columbus, and Cincinnati. Private passenger rail travel along this corridor ended in 1971. Jolene Molitoris, director of the Ohio Department of Transportation, testified before Congress that with federal stimulus help, Ohio could be in "operation quickly" on existing tracks at conventional speeds, laying a foundation for high speed rail in the future.

Federal Government Increases Its Commitment to Better Roads and Transit, but Slowly

Transportation infrastructure is drawing significant attention from the new administration. President Obama's first major legislative effort, the economic stimulus bill, allocated nearly $50 billion to transportation projects. His first budget, for fiscal year 2010, included plans for a national infrastructure bank that would be the first large new funding source for such projects in many years. The new secretaries of the Department of Transportation, Ray LaHood, and Housing and Urban Development, Shaun Donovan, have announced a plan to work together to build housing and "livable" neighborhoods in conjunction with mass transit. And Obama has announced a plan to connect the country's major economic centers with high speed and upgraded conventional rail.

Shortly after his election, President Obama began pushing for a massive economic stimulus package, which Congress ultimately passed on February 13, 2009. In speeches during the transition, he called for an investment in transportation infrastructure not seen since the creation of the federal highway system in the 1950s. At the same time, he said the stimulus investments should be "transformational," helping to put the country on a path to energy independence, curb climate-damaging emissions, and provide the underpinnings of an emerging new economy that would be dynamic, mobile, and less dependent on fossil fuels. Many envisioned a "new New Deal," a federal building program on the scale of the Depression-era construction of highways, parks, dams, civic buildings, and more, much of which we still use today.

The Stimulus Bill

Those aspirations ran head-on into the screen applied by President Obama's economic advisers, led by Lawrence Summers. In order to provide the hoped-for, near-term stimulus, Summers's team urged spending on "shovel-ready" projects that could put people to work almost immediately. There was no time to do the planning and big-picture thinking necessary for "transformational" investments. This meant that much of the money would have to be pushed out through existing programs, for projects—highways, primarily—already in the pipeline. It was a major disappointment for those hoping that the stimulus would mean a major infusion for oil-saving, low-carbon transportation systems, such as rail and other public transit, that could become the spines of more walkable or bike-friendly neighborhoods.

"We had all been talking about this potential new vision, but when we did the recovery package it was, 'Shovel the money out the door and forget about the consequences,'" lamented Robert Puentes, who tracks transportation issues for the Brookings Institution. "In the end we fell back on the same processes, the same projects, and the same interests."

In leaning on yesterday's priorities for expediency's sake, the nation postponed the debate on priorities for the future until the renewal of the federal transportation program later this year, Puentes said.

Still, the final stimulus bill, dubbed the American Recovery and Reinvestment Act, did break some new ground with unprecedented flexibility in how the money can be spent. With nearly 40 percent of the transportation dollars dedicated to intercity rail and public transit construction and rehabilitation, the bill broke with the past custom that highways always receive at least 80 percent of transportation funds. After White House Chief of Staff Rahm Emanuel intervened on the president's behalf, $8 billion was added for high speed rail and "higher speed" conventional rail, as well as nearly $1.5 billion for Amtrak.

Even the $27.5 billion ostensibly designated for highways was put largely into a funding category, the Surface Transportation Program, that can be used for transit, ports, and other transportation modes. About 30 percent of the money was assigned to metropolitan area planning agencies for allocation as they see fit. Congress resisted entreaties to require state Departments of Transportation to fix their worst highways and bridges before building big, new projects. Even so, the requirement that the funds be spent quickly has meant that most DOTs are fast-tracking maintenance and rehabilitation, resurfacings, and bridge painting. These are the types of projects that can move without a lot of engineering and approval processes.

The bill also designates $8.4 billion for public transit capital projects. It was a bittersweet moment for transit supporters: Overjoyed at receiving the capital dollars at a moment when transit ridership was at a 50-year high, they were disappointed that there were no funds to preserve existing service in the face of economic devastation that was requiring major cuts in operations.

The 2010 Budget

If the stimulus debate sent mixed messages about the nation's direction on transportation infrastructure, President Obama's first full-year budget, for fiscal year 2010, seemed to give clearer indications of future priorities. The narrative in the budget overview emphasized investments that advance environmental sustainability, livable communities, and productive growth. It charted new territory by proposing to require more rigorous economic analysis and performance measures for transportation projects. The president's budget document also linked cleaner transportation options like public transit to climate and air-quality issues.

President Obama also called for $25.2 billion to create and operate a national infrastructure bank through 2019. Like the Federal Reserve Bank, the infrastructure bank would operate under an independent board, evaluating and funding infrastructure of national significance, including water and sewer plants, public transit systems, roads and bridges, and affordable housing. The bank essentially would be a revolving loan fund, allowing transportation projects to be debt-financed. Most federal projects today are funded on a pay-as-you-go basis from gas tax receipts.

In a February 2009 interview President Obama said, "The idea [is] that we get engineers, and not just elected officials, involved in thinking about and planning how we're spending these dollars … The needs are massive and we can't do everything. It would be nice if we said here are the 10 most important projects and let's do those first, instead of maybe doing the 10 least important projects, but the ones that have the most political pull."

Not everyone in Congress loves the idea. Sen. Max Baucus, the Montana Democrat who chairs the Finance Committee, which would have a say on creating the legislation, has voiced opposition. "I think that bank idea will rob the future growth of the highway program and that will destroy the national scope of our highway program," he said during an April hearing on transportation spending held by the Senate Environment and Public Works Committee. Baucus indicated that he believes that wealthier states would be better suited to compete for the funds, which would have to be paid back.

A New Direction for the U.S. DOT

At the Department of Transportation, Secretary Ray LaHood—the former Illinois congressman who was the second Republican in the administration—came into office promising to promote "livability" as the watchword of his tenure.

"The era of one-size-fits-all transportation projects must give way to ones where preserving and enhancing unique community characteristics, be they rural or urban, is a primary goal rather than an afterthought," LaHood said at his Senate confirmation hearing.

He followed that with a joint announcement with Housing and Urban Development Secretary Shaun Donovan that the two departments would begin to coordinate on transit planning and housing development, and that they would examine federal rules that either promote or thwart the creation of walkable neighborhoods. Smart growth principles would animate this initiative, the two said. They aim to build affordable housing near public transportation, create shorter neighborhood street blocks to promote walking, and expand bus routes to reach more areas.

Reviving Rail Networks

On April 16, with LaHood and Vice President Joseph Biden by his side, President Obama pulled back the curtain on his vision for a revived rail network for America, including development of high speed passenger rail lines in at least 10 regions. This would be the first such transnational effort since the Interstate Highway System was launched in 1956. To jumpstart the project, he said that he would add $1 billion a year for five years to the $8 billion to be spent in two years under the stimulus bill.

In announcing the plan, he noted that clogged highways, struggling airlines and overburdened airways, along with uncertain energy costs and the need to reduce oil consumption, threatened the long-term viability of intercity travel in the United States.

"What we need, then, is a smart transportation system equal to the needs of the 21st century," the president said, "a system that reduces travel times and increases mobility, a system that reduces congestion and boosts productivity, a system that reduces destructive emissions and creates jobs."

The administration plan outlined 10 corridors that have passed muster in various studies: a northern New England line; an Empire line running east to west in New York State; a Keystone corridor in Pennsylvania connecting Philadelphia and Pittsburgh; a Chicago hub network; a southeast network connecting Washington, D.C., to Florida and the Gulf Coast; a Gulf Coast line extending from eastern Texas to western Alabama; a corridor in central and southern Florida; a Texas-to-Oklahoma line; a Portland-Seattle-Vancouver corridor in the Northwest; and a California corridor from San Francisco to Los Angeles that was part of the voter-approved financing initiative last fall.

"Imagine whisking through towns at speeds more than 100 miles per hour, walking only a few steps to public transportation, and ending up just blocks from your destination," President Obama said. "It is happening right now; it's been happening for decades. The problem is, it's been happening elsewhere, not here." He noted that Japan, France and Spain all were ahead of us. But, he added: "There's no reason why we can't do this."

Complete Streets Address the Needs of All Travelers

"Complete streets" refers to the concept that roads should meet everyone's needs, not just motorists but also walkers, bicycle riders, and bus riders. A growing number of communities are using complete streets policies to reduce accidents, get people more physically active, and promote walkable neighborhoods, which have held their property values during the current downturn. Complete streets policies will increase in importance as a greater proportion of Americans reach old age and are forced to give up driving.

"Complete streets" policies set out to make road projects meet the needs of everyone using the road, not just motorists, but also people walking, riding bicycles, or catching the bus. Across the country, a growing number of communities are using this deceptively simple tool to change the way they approach transportation. Adopted as a state law, local ordinance, or even as a city council resolution, these policies set a new vision for transportation investments. More than 85 states, regions, and cities have adopted such policies, including new state laws passed in California and Illinois and policy resolutions or ordinances in major cities including St. Paul, Miami, Chicago, Seattle, Sacramento, and Charlotte. And the pace is accelerating.

Complete Streets across the Country

When tiny University Place outside of Tacoma, Washington, incorporated in the mid-1990s, one of its first priorities was adding sidewalks to the former county roads. The town started by cajoling the gas company to split costs for transforming gravel shoulders into sidewalks during gas line replacements. They looked for opportunities to install bike lanes during repaving projects and to put in pads to provide space for county bus shelters. Then they started making more radical changes.

"People from outside University Place comment about how much they love driving down Bridgeport Way," says Steve Sugg, deputy city manager, describing one of the first streets to get a full complete streets treatment. "There is a sense of calm." The redesigned road features a landscaped median, new pedestrian crossings, bicycle lanes, a multi-use path and improved sidewalks. Sugg notes that when Trader Joe's was looking for a place to locate a store in the Tacoma region, they picked a site on Bridgeport Way, perhaps because of the extensive street improvements.

University Place has added 23 miles of sidewalks to its streets since incorporation and has installed several modern roundabouts, the first in Washington State. Now the town is working with citizens on planning a Town Center to realize broader smart growth principles.

In Jefferson City, Missouri, in March 2009, disability advocates, trail-building organizations, bicycle advocates, health groups, and even a REALTOR© spoke at a state House hearing or wrote letters in support of a complete streets bill. In Hawaii, bicycle advocates and the state AARP chapter made common cause this spring to push for a similar bill with a particularly Hawaiian twist—they've linked it to a Hawaiian tradition known as "the splintered paddle"—a native myth that asserts everyone's right to travel safely. State legislators in Connecticut, Texas, West Virginia, and Maine have also introduced complete streets bills.

Complete Streets on Capitol Hill

Complete streets policies are also getting federal attention. Sen. Tom Harkin and Rep. Doris Matsui have introduced the Complete Streets Act of 2009 into the U.S. House and Senate (S.584, H.R.1443). "We need to ensure streets, intersections, and trails are designed to make them easier to use and maximize their safety," said Sen. Harkin upon introduction of the bill. "This legislation will encourage Americans to be more active, while also providing more travel options and cutting down on traffic congestion."

The bill would require states and metropolitan planning organizations to adopt complete streets policies to be applied to federally funded road projects. It is expected to become part of the upcoming authorization of the federal transportation bill.

Demographic Changes

Complete streets policies are gaining all this ground for fundamental reasons of demographics and safety. By 2025, nearly one in five Americans will be over the age of 65, and they will make up one-quarter of the driving population. As they age, many will face disabilities that will force them to give up driving during the last decade of their lives. Yet they may be reluctant to give up the keys when they face neighborhoods with infrequent and inadequate crosswalks, no sidewalks, poorly designed bus stops, and inadequate speed control.

A recent AARP poll found that 47 percent of older adults said they did not feel safe crossing a major street near their home. In another large survey, AARP found that nearly two-thirds of the more than 1,000 planners and engineers surveyed have not yet begun considering the needs of older users in their multimodal planning.

AARP recently issued a report based on this research, "Complete Streets for an Aging America," that makes three broad recommendations for transforming road design to better cope with an aging population, summarized as "Slow Down, Make it Easy, and Enjoy the View." It recommends reengineering streets for slower travel speeds, making intersections less complex while providing lower-speed routes, and reducing visual clutter.

It is no coincidence that the recent push for complete streets comes against a backdrop of a decline in the amount of driving and a rise in the use of public transportation, even as more people take part in Bike to Work Day activities every year.

Safer and Healthier Streets

Research is starting to show that a complete streets approach also leads to fewer crashes and increased physical activity. A recently released study of a new pedestrian pathway along a major bridge in Charleston, South Carolina, found that two-thirds of the users of the bridge said the new facility had led them to get more exercise.

Promoting physical activity as a part of daily life has been at the center of a strong move in Minnesota toward complete streets, with three jurisdictions adopting policies in the first months of 2009: Hennepin County (Minneapolis), Saint Paul, and Rochester. The insurer Blue Cross/Blue Shield (BCBS) of Minnesota has been supporting "active living" initiatives across the state, based on research that shows that people who live in walkable environments, or who regularly take public transportation, are more likely to be active enough to ward off chronic disease. BCBS sponsored three Complete Streets Workshops in December to help planners and engineers understand how to broaden their scope when planning road projects to take into account the needs of pedestrians, bicyclists, and public transportation users.

Higher Property Values

For some supporters, the economic impact is a primary reason to support a complete streets approach.

Chris Leinberger, author of "The Option of Urbanism: Investing in a New American Dream," watched the recent downward trajectory of home prices and notes that most of the dive took place in places built for "drivable suburbanism," where the road network features high speed arterials designed only for cars. "Places that are walkable urban neighborhoods have held their value over the last two years," says Leinberger.

An indicator of the potential importance of a multimodal transportation network to property values can be found in the real estate tool Walk Score. Walk Score uses the magic of Google Maps to give every address in the nation a score from 0 to 100, based on the number and variety of destinations within walking distance. Front Seat, the firm behind Walk Score, has commissioned research to determine if a higher Walk Score correlates to a higher home value. The preliminary results show that each additional point on the Walk Score scale correlates with increased housing values on the order of $1,000 or more, depending on the regional market. Two major real estate Web sites, Zip Realty and Zillow, now feature Walk Score on property listings.

Walk Score is based on the crow-fly distance to nearby destinations, so it doesn't take into account the disconnected street network common in many newer developments, or the lack of sidewalks and crosswalks that can make walking unpleasant, impractical, or dangerous.

But connected, complete streets are a prerequisite to true walkable urbanism, according to Leinberger. "If you have an eight-lane arterial without complete streets infrastructure, you will never see high-density walkable urbanism take place along that corridor. Complete streets will be a precondition before you can get walkable urban development that will help meet the pent-up demand for this type of neighborhood."

High-Occupancy Toll Lanes May Be a Solution for Urban Congestion

Cities looking to lessen congestion on their highways are increasingly considering high-occupancy toll (HOT) lanes as a way to solve traffic issues, reduce air pollution, and increase transportation budgets. HOT lanes are free for carpoolers, but single-occupancy vehicles must pay a toll. They are already in place in southern California, Minnesota and Houston, and under construction in South Florida.

Supply and demand is perhaps the most basic economic principle. Cell phone companies charge their customers more in peak times, restaurants offer early bird specials, and theaters give discounts for matinees.

This principle—the backbone of a market economy—is being used to help manage gridlock on our nation's roads. High-occupancy toll (HOT) lanes are increasingly being considered to better control the flow of traffic and reduce the amount of time people spend idling in their cars. Instead of focusing on the supply side by creating new roads, transportation engineers, city planners and governments are switching gears and focusing on demand.

What Are HOT Lanes?

HOT lanes combine two of the more effective highway management tools: value pricing and lane management (restricted access to designated highway lanes based on occupancy or vehicle type). The idea behind them is simple: drive for free in a HOT lane if you have enough people in your car or van, or pay a premium to use the lane if you don't meet the minimum passenger requirements.

Buses travel in HOT lanes for free, as do emergency transportation vehicles and motorcycles. Traditional lanes always remain available for folks who don't want to pay for the privilege. The fees collected from HOT lanes provide a source of government revenue for road improvements, and have the added benefit of making people understand the value of moving in congestion-free traffic. HOT lanes also provide incentives for people to use buses. Indeed, the hope is that HOT lanes will boost mass transit services. "When you're sitting there in your car with your coffee stuck in a traffic jam watching the buses whip by … well, that's a great marketing tool," said Stephen Reich at the University of South Florida Center for Urban Transportation Research in Tampa.

Money, space constraints, and environmental concerns are pushing aside the historical interest in roads in favor of more innovative ideas like congestion pricing and HOT lanes, Reich explained. Many HOT lanes are converted from highway medians or high occupancy vehicle (HOV) lanes. However, HOT lanes are not one-size-fits-all. Decisions like how many people must be in a car and whether financial breaks should be given to owners of fuel-efficient hybrids are made at the local level.

Beginnings in California

The first HOT lane was SR 91 in Orange County, Calif. A four-lane, 10-mile stretch of toll road was built in the median of California's Riverside Freeway between the Orange/Riverside County line and the Costa Mesa Freeway (State Route 55). Since it opened nearly 15 years ago, more than 64 million vehicle trips have been made, saving customers more than 32 million hours of commuting time.

Unlike some other states' HOT lanes, California's SR 91 lanes do not have variable dynamic pricing, according to Orange County Transit Authority Interim Executive Chief Officer James Kenan. The Orange County Transit Authority turned away a federal grant that would have allowed the roads to convert to dynamic pricing, in which drivers don't know the costs of the lanes in advance. "They want to know the toll before they enter that toll lane," Kenan said, noting that when OCTA asked its customers about dynamic pricing they rejected the idea.

To ensure that the roads are appropriately priced, charges are reviewed quarterly and adjusted to ensure the smooth flow of traffic, he said. The highest cost for the 10-mile stretch is levied on Thursday afternoons between 4 and 5 p.m., when commuters are leaving their jobs and traveling eastbound to bedroom communities. On average, 2,900 cars travel the lanes between those hours. In the first quarter of 2009, workers eager to return home paid $9.55 for that stretch of congestion-free lanes. Conversely, the least expensive time to travel on the road is between 2 a.m. and 3 a.m. The HOT lanes for westbound traffic cost $1.25 in the first quarter of 2009 and have averaged about 10 cars during that hour, according to Kenan.

The Future in Florida

There are similar success stories for HOT lanes in Minneapolis (I-394), San Diego (I-15) and Houston (I-10). So perhaps it's no surprise that South Florida, with its notoriously congested arteries (a Texas Transportation Institute Report released in 2007 showed that drivers in Miami wasted 50 hours and 35 gallons of gas sitting in traffic in 2005) has turned to the use of HOT lanes to help solve its traffic woes.

Interstate 95 Express in Miami-Dade County is being constructed in two phases and, when complete, will offer HOT lanes for northbound and southbound traffic on I-95 from SR 112 to the Golden Glades areas. Eventually 95 Express HOT lanes will also connect Miami to Ft. Lauderdale. In Miami-Dade, the approach is to offer toll-free options for carpool drivers as well as hybrid car drivers who are willing to register with South Florida Commuter Services. Jennifer Ryan, marketing director for South Florida Commuter Services, said that since summer 2008, 2,712 hybrid car owners have registered with the agency to use the lanes, as have 1,206 carpools and 212 vanpools.

At the Ft. Lauderdale end of the project, plans call for three reversible HOT lanes in the median along 10.5 miles of I-595 running east-west across populous Broward County. Congestion pricing will be used, but the amount of the tolls hasn't yet been decided by Florida transportation officials. In all, the Broward project will cost about $1.8 billion. Construction is expected to begin this summer and be completed by 2014, according to Barbara Kelleher, public information officer for the DOT's offices in Ft. Lauderdale.

Early buzz on the HOT lanes in Ft. Lauderdale has been positive. "There hasn't been a pushback," said Kelleher, adding that the construction project actually has gotten local businesses excited that the project will bring new jobs. "The focus really has been jobs, jobs, jobs."

Not for Everybody

While congestion pricing is the hot solution for some cities, it's not the silver bullet for traffic flow problems everywhere and, politically, can still prove a tough sell.

When New York City Mayor Michael Bloomberg tried a congestion pricing corridor for most trucks and cars entering the city, he was soundly beaten back. The initiative was modeled after one in London, which adopted a congestion pricing scheme in 2003 as a way to reduce traffic congestion and raise revenues to fund transport improvements. Bloomberg maintained that congestion pricing would reduce traffic congestion in the city by 6.3 percent and raise $491 million for mass transit there. But the plan—which Bloomberg sought to fund in part with a $354.5 million grant from the federal government—was never approved by the General Assembly.

New York State Assemblyman David McDonough is a member of the Committee on Transportation and opposed Bloomberg's proposal. McDonough said that while he understands the congestion problems facing New York City, he felt the proposal would have been too big a financial burden on area residents. As successful congestion pricing initiatives are designed, built and implemented, however, the future may hold more options for overly congested commutes across the country.

Managing Transportation Demand Puts Livable Communities Within Reach

In years past, transportation planners would look at projections for population growth and land use changes in their communities and use that information to estimate the future demand for roads. Then they'd draw up construction plans to meet that demand.

But that approach won't serve anymore. For one thing, Americans' appetite for driving has far outpaced population growth: since 1980, the number of miles Americans drive each year has grown three times faster than the U.S. population. While transportation demand models can account for the additional driving, policymakers have begun to question the wisdom of reflexively meeting the demand by simply building more roads. Instead, they have looked for ways to address the problem from the demand side, for a number of reasons.

For one thing, simply building more and more new roads is expensive. Inflation in the construction industry has been steeper over the years than inflation in the economy as a whole, thanks to increased demand for materials like concrete and steel from rapidly growing economies such as India and China. At the same time, many towns and states are facing a maintenance backlog that is also squeezing their transportation budgets. The federal government can help with some major transportation projects, but much of the burden for road building falls on state and local governments. While state and local governments can fund roads with fuel taxes and toll revenue, when these funds are short they may look to other sources such as property taxes, and other levies on real estate such as transportation impact fees charged to new construction.

Also, in many communities there is simply not that much space to build new roads or add new lanes. True, eminent domain could be used to take needed land from private property owners, but that is politically unpopular and usually a last resort. Even if communities do find the money and the land for new roads, in many cases it doesn't fix their problem, as new capacity is often consumed quickly through an occurrence that planners refer to as "induced demand," for example when drivers take trips they'd otherwise forgo if the roads were crowded (see "Good Transportation Policy Must Plan for Induced Demand").

But simply tolerating the current situation is out of the question. Congestion and delay on the roadways degrade the quality of life in our communities. Because REALTORS® are committed to protecting and improving quality of life, we support efforts to find creative solutions to traffic congestion.

Transportation Demand Management (TDM) is the term given to programs, policies, and strategies to reduce demand for car travel in urban regions and corridors. TDM measures help bring the supply/demand relationship back into better balance, thereby reducing costs for public infrastructure and transportation service.

In practice, TDM measures fall into six broad categories: mode shift, time shift, ride sharing, virtual travel, pricing, and support measures.

Mode Shift Measures

One of the primary strategies to reduce vehicular travel, especially in peak travel periods, is to increase transit ridership. In many urban areas, it is also possible to shift vehicle trips to walking and bicycling. The potential market for transit trips tends to be in the five- to 25-mile range (and longer), while the primary market for bike trips is one to five miles, and for walking, two miles or less. In many urban areas, some of the transit market will originate at park 'n ride lots, so the impact on vehicular travel is not as great as where people can walk or bike to transit.

Transit service improvements. These include improvements in fixed routes, scheduled public transit service such as expanded route coverage, increased service frequency, extended service hours, increased system capacity, and increased corridor speeds. Implementation of high capacity transit (rail and bus rapid transit) also offers the potential to elevate property values and spur development and redevelopment around stations.

Shuttles. Special shuttles (vans and small buses) can be operated by employers to bring employees to work, by resorts or hotels to help guests get around, or by downtowns and activity centers to create a "park once" environment where people

do not drive for short trips within the area. All of these have the effect of decreasing vehicular travel.

Pedestrian and bicycle infrastructure. Where convenient and safe walking and bicycling environments and facilities are provided, walking and bicycling increase, with associated decreases in motor vehicle travel. About one-fourth of motor vehicle trips in the United States are less than a mile in length, so the potential impacts are significant. Increasing walking and biking activity brings additional potential benefits in the form of improved public health. Other benefits accrue from the fact that short vehicle trips have a disproportionate impact on air quality, carbon emissions, and traffic congestion. Finally, shifting short trips to nonmotorized circulation frees capacity on street networks for longer trips, including commuter travel.

For employers, providing convenient, secure bike parking and showers and lockers at the work site can significantly increase bicycle commuting. Many downtowns and destination areas have inadequate or inconvenient bicycle parking and correcting this deficiency can relieve some demand for auto parking, especially all-day employee parking.

Urban design. Much of suburban America was built under zoning provisions that require separation of uses. Consequently, residential areas built since World War II have few or no embedded retail, service, institutional, or employment land uses, while most commercial land use has no embedded residential component. The result is that access to destinations requires motor vehicle travel. It is possible through mixed use zoning, transit-oriented development and other urban design strategies to reduce vehicular trips significantly. In addition to traffic alleviation, this reduces parking demand, generating significant savings. The most essential element in modern urban design is providing a high-quality walking environment. This not only produces transportation benefits, but adds value to property and generates other public benefits, including improved public health.

Time Shift Measures

In most metropolitan regions, a significant amount of total daily travel occurs during peak travel periods, usually between 7 a.m. and 9 a.m. and again between 3 p.m. and 7 p.m. Highways and streets operate at lower efficiency when flooded with traffic, so there is strong justification for trying to "spread the peak" by shifting some travel out of these congestion time periods. Most time shift techniques are either pricing measures (discussed below) or work schedule measures focused on major employers, discussed here.

Flex time or staggered shifts. Flex time and staggered shifts have been common practice at large employers since the 1970s. While such measures probably have little impact at a regional scale, they can be quite beneficial in specific corridors where the impact of one or more major employers is large. By staggering arrival and departure times, larger companies (as well as universities and other traffic-intensive destinations) can reduce peak period congestion at nearby intersections, with significant benefit to the general public as well as to their employees.

Compressed work weeks. Compressed work weeks (e.g., four 10-hour days, or nine days on/five days off) are also common and have the dual effect of shifting some commuting out of peak periods and reducing the amount of commuting. Theoretically, a "four tens" schedule practiced by all employees (on different days) would reduce commute travel to that employer by 20 percent. Again the benefits will be more significant at the corridor and intersection level than they will be regionally.

Special events management. Sports venues, concert facilities, fairgrounds, and special events that generate intensive traffic over short time periods have access to a variety of tools for reducing peak traffic. In addition to event scheduling, these include encouraging guests to arrive early and/or delay departure by providing pre- or postevent programming.

Ride Sharing Measures

These programs encourage ride sharing through carpools and vanpools. The measures are focused on commuters and are administered by employers, Transportation Management Associations (see below), or local or regional public agencies.

Ride-matching services. Ride-matching programs help commuters find others who work near them, live near them and are interested in participating in carpools or vanpools. A commuter database can be used to match origins, destinations, and schedules. Carpooling offers benefits to employees by reducing the household costs of commuting. Employers benefit from reduced parking demand at the job site. The public benefits from reduced traffic in commute corridors. Carpooling measures have the lowest per-mile cost of any category of TDM and consequently generate the highest net value per dollar invested.

Vanpools. Vanpools allow groups of people to share a ride between home (or a meeting location) and work (or other common destination). Vehicles may be provided by one of the vanpool participants, by a public or private support program, or by an employer. Vanpools have special value and appeal for those who work far from home.

Preferential parking. Providing vanpool and carpool parking closer to the work site or in a preferred location (e.g.,

covered parking) not only encourages participation in ride share programs but also raises the visibility and status of these programs.

Virtual Travel Measures

The development of the Internet and associated digital systems has opened up new ways for people to avoid certain trips entirely. The first two measures described below—telecommuting and virtual meetings—are sometimes combined under the title "telework."

Telecommuting. Telecommuting had its origins as an employment practice in the 1950s, long before desktop PCs and the Internet were available. For workers in knowledge and service sectors, telecommuting offers significant potential benefits in reduced travel and the opportunity to reduce auto ownership. For employers, telecommuting offers some potential to reduce commute traffic and parking demand. For some years there has been interest in "telecommute" centers or "remote office" buildings where employees can have access to the equipment and services of a regular office worksite at a location close to where they live. While some of these do exist—either entirely for a single company or as multicompany shared facilities—they have not been as popular as originally expected.

Virtual meetings. Most companies and employers make at least some use of virtual meetings, from simple teleconferencing to advanced interactive "webinars" and videoconferencing systems. These techniques reduce local and regional travel, which can be beneficial in metropolitan regions with crowded highways. But they have the greatest impact on long distance travel, reducing business expenses for air travel and per diem travel costs. In many cities, for-hire videoconference and Web-based meeting facilities have been developed to provide smaller companies with access to these systems.

Teleshopping. Home delivery of pizza was only the beginning. Most cities now have grocery stores, drycleaners, and other businesses that will accept Internet or telephone orders and make home deliveries. While this can reduce trips, it also offers benefits to people with limited access to transportation and people who cannot or do not drive.

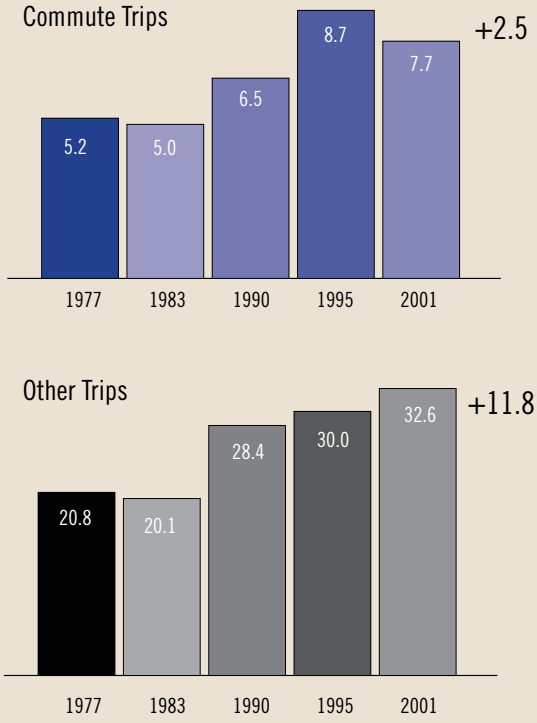
Pricing Measures

Most travel in the United States is discretionary. In other words, many trips are nonessential and can be rescheduled or avoided entirely. In fact, commuting to work represents less than one-fourth of daily travel. Much of the growth in traffic over the past 50 years has been in response to roadway expansion, and 80 percent of this growth has been in noncommute travel. (See figure, right.)

Parking pricing. Parking is expensive to build and maintain, yet most parking is free to the user. Imposing or increasing parking costs is an effective tool for reducing driving. Although controversial, parking pricing can increase non-auto mode shares for downtowns and other destination areas. Employers can impose parking fees in a cost-neutral way by also offering an equivalent "cash-out" option for those who choose not to drive.

Employer transportation allowance. Transportation allowances are employer benefits that companies provide for all employees, including those who drive alone, to defray the costs of travel. Allowances can provide a positive economic incentive to shift from driving alone to ride sharing, transit, or other commute techniques, because employees whose travel cost is less than the allowance are allowed to pocket the difference. This is generally coupled with a parking cash-out (described above). Transportation allowances of up to $120 per month ($230 for March–December 2009) are nontaxable benefits for employees but can be expensed by employers.

Daily miles of vehicle travel per capita (U.S.)



Note: Data are from National Household Transportation Surveys. The NHTS survey was conducted again in 2008 and new data will be made available late in 2009.

Congestion pricing. Congestion pricing is the practice of charging motorists higher tolls to use freeways, bridges, or tunnels during peak travel periods. Toll prices are varied strategically to reduce traffic in congested corridors or at congested times of day. The dynamics of traffic congestion are such that small increases or decreases in traffic on congested facilities have a large impact on speeds and flow. Variable tolls can be based on real-time traffic data to maintain targeted levels of service.

Mileage fees. Recently there have been proposals for "VMT fees" to replace all or part of the "gas taxes" assessed by the federal and state governments. Such a fee would be a "road use fee" based on actual vehicle miles of travel (VMT) by each vehicle, rather than on gallons of fuel purchased. The concept is that a GPS transponder installed in each vehicle would keep track of miles driven and would exchange that data with the fuel pump when a vehicle is refueled. A fee based on miles driven would be assessed instead of fuel taxes, or in addition to whatever fuel taxes remained in effect. If geographic data and time-of-travel data were collected, this method of taxation would allow fees to be set differently for travel in peak congestion periods or for travel in specific corridors. Although the state of Oregon has tested a VMT fee and there are some state annual mileage fees for heavy trucks, no such system is currently in use in the United States for general motor vehicle travel.

Support Measures

There are a wide variety of programs and strategies that do not necessarily reduce vehicular travel directly, but encourage the use of measures in the first five categories or increase the magnitude of their impact.

High Occupancy Vehicle (HOV) lanes. HOV lanes provide time advantages in congested corridors for people who carpool, vanpool, or take bus transit. In many corridors, the effectiveness of HOV lanes can be further increased by providing commuter parking lots close to interchanges.

Car sharing. Car-share programs are becoming common in larger urban areas. They are a type of car rental where members of the program rent vehicles for a short period of time (often by the hour). Urban car sharing is often promoted as an alternative to owning a car where transit, walking, and bicycling can be used for most trips and a car is only needed for out of town trips, moving large items, or special occasions. Car sharing can also be used as an alternative to owning multiple vehicles for households with more than one driver.

Transit passes. Transit passes may be offered through employers, universities, neighborhoods, or other groups. Various related benefits, including access to parking and guaranteed rides home (see below) can be bundled into the pass. In addition to encouraging transit ridership, passes are an effective employee recruitment and retention tool, and employer costs are tax deductible up to prescribed limits.

Transportation Management Associations (TMAs) and Organizations (TMOs). These are nonprofit organizations that promote the more efficient use of transportation and parking resources in a particular area and help commuters take advantage of TDM programs. TMAs are usually public-private partnerships consisting of a group of employers in a specific district or corridor with local or regional government support. TMAs work with their members to provide information and education on commuting alternatives and may coordinate the actual delivery of TDM programs, such as the sale or distribution of transit passes.

Guaranteed Ride Home (GRH). Usually GRH programs are tied to transit passes, employee transportation allowances, or other similar TDM measures. They provide access to a free or subsidized ride home in the event of an illness, a family emergency, or another unforeseen event. The ride is usually provided by taxi, although some programs involve company vehicles or rental cars. The potential need for access to a personal car is a major disincentive to carpooling, riding public transit, and other commute-related TDM measures, so a GRH element in TDM programs can have significant impact. In actual practice the ride home is not used very often by employees, so the cost per employee for well-administered programs is low.

Special events, promotions and TDM marketing. Most TDM programs—whether administered by employers, TMAs, or public agencies—include a marketing element that among other things schedules annual "bike-to-work" days, commuter fairs, and other events designed to increase awareness of alternatives to driving alone. TMAs often publish newsletters and often serve as clearinghouses for information about new transit routes, changes in parking prices, transportation allowances, and related benefits.

Program reporting. Successful TDM programs require ongoing monitoring and reporting of program participation and results. Benchmarks and objectives should be identified and reporting should be timely, frank, and transparent.

Examples and Resources

City TDM Program—GO Boulder

The City of Boulder's "Great Options" TDM program was established in 1990 and has served as a model for many other city TDM programs around the United States. GO Boulder is part of the City's Transportation Division in the De-

partment of Public Works. General information about GO Boulder may be found at: http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=8774&Itemid=2973.

A description of the City's TDM program priorities and strategies may be found at: http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=413&Itemid=331.

Denver Regional Transportation District (RTD) Eco Pass Program

The Denver region's transit agency (RTD) initiated its innovative Eco Pass program in the early 1990s as a regional TDM measure, at the urging of the City of Boulder and with the support of the Denver Regional Council of Governments. The Eco Pass is an annual photo ID transit pass purchased by employers for their employees. Information about RTD's Eco Pass program may be found at: http://www.rtd-denver.com/EcoPass.shtml.

The City of Boulder has aggressively supported the Eco Pass program through its GO Boulder office (see above). Information about Boulder's Eco Pass efforts may be found at: http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=8834&Itemid=3001.

RTD is also one of the nation's leading transit agencies and is currently engaged in implementation of the FasTracks rail transit network. Information about RTD and FasTracks may be found at: http://www.rtd-denver.com.

Seattle Regional Commute Trip Reduction Program

(Note: The following text uses direct quotes from the website cited below.)

In 1991, the Washington State Legislature passed the Commute Trip Reduction (CTR) Law requiring employers to work with employees to reduce the number and length of drive-alone commute trips made to the worksite. The CTR Law (RCW 70.94.524 - 551) was adopted in 1991 as part of the Washington Clean Air Act. The purpose of the law is to reduce air pollution, traffic congestion, and energy consumption. Motor vehicles generate more than 50 percent of all air pollution in Washington.

The law requires major employers (those with over 100 employees) to develop and implement commute trip reduction programs. The programs must be designed to meet the commute trip reduction goals set for the employer's commute trip reduction zone. The employer must submit an annual employer program report to the local jurisdiction for review and approval. Every two years, employers must conduct employee commute surveys or supply equivalent data showing their progress toward the commute trip reduction goals. If an employer does not meet the reduction goals, the jurisdiction can require the employer to modify its program.

More information about this program can be found at: http://www.seattle.gov/Transportation/commute.htm.

This website provides information about the Washington state law creating the program as well as program performance. A number of related websites also can be accessed from this page.

King County, Washington "AIMs High" Performance Management Reporting

King County is an urban county in the Puget Sound region encompassing a number of cities, including Seattle. King County's Office of Strategic Planning and Performance Management reports its "Annual Indicators and Measures" which include several mobility and demand management measures. Current data and information on the AIM system may be found at: http://your.kingcounty.gov/aimshigh/search2.asp?BEMobility.

Lloyd District Transportation Management Association (LDTMA)

The Lloyd District is an area of office employers, retail businesses, and a convention center located across the Willamette River from downtown Portland. The Lloyd District is directly served by the MAX line of the Tri-Met light rail transit network. LDTMA represents an excellent example of a progressive TMA embedded within a city and region that also have strong TDM programs. Information about LDTMA may be found at: http://www.lloydtma.com/index.html.

Other Resources and Information

Publication 15-B, Employer's Tax Guide to Fringe Benefits, is available from the IRS and describes current taxing provisions relative to employer transportation benefits programs, including parking cash-out, transit passes, and transportation allowances. A copy can be downloaded at: www.irs.gov/pub/irs-pdf/p15b.pdf.

The Victoria Transport Policy Institute, a research and advocacy organization, maintains a website that includes a useful "Online TDM Encyclopedia"at: http://www.vtpi.org/tdm.

Public Private Partnerships Can Save Public Funds and Lower Costs

As America's transportation system runs low on money, one way to bridge the gap between needs and available funds is through public-private partnerships (PPPs). PPPs may be initiated to construct new facilities, to operate and maintain existing ones, or both. On the positive side of the ledger, they may reduce project costs and give government improved access to innovation and technology. But on the other hand the public can grow dissatisfied when the control of public assets rests with private companies and those companies set and collect tolls and fees. Debt financing and environmental protection issues may also be more problematic with PPP projects.

America's transportation system is running out of money. The gas tax, the primary source of revenue for the Highway Trust Fund, has not been raised in 15 years. When state and local governments run short on money from fuel taxes and tolls for transportation improvements, they may look to other sources, such as property taxes and other levies on real estate (e.g., transportation impact fees charged to new construction). In any case it is generally agreed to be a bad idea to raise taxes during a recession.

Yet America continues to need to build new transportation infrastructure and to maintain the infrastructure we already have.

One possible way to bridge the gap between needs and available funds is through public-private partnerships. A "public-private partnership" (PPP) is a contract between a public-sector entity and a private-sector entity. In the current transportation policy context, PPP refers to special agreements that assign a greater degree of responsibility to the private entity. Thus, PPPs delegate some of what has historically been thought of as a public agency role to a private entity. PPPs embody elements of "outsourcing" and may also entail partial or full "privatization" of public resources or assets.

The public-sector entity involved in a PPP may be a federal agency, a state agency, a regional agency, or a local government. The private-sector entity may be a single company (corporation or partnership) or, more often, a consortium or team of companies. These private-sector entities have money to be invested that far exceeds government's current capacity to tax its citizens and build infrastructure itself. In some cases, their profit motives may also make them more efficient and better at containing costs than government.

Public-private partnerships have been common for many years in Canada and Europe and have been used widely for certain specific activities in the United States. PPPs are now becoming much more common in the United States and are being used for a broader range of contractual arrangements, although they are still most commonly used to deliver very large projects (over $1 billion).

There are important policy issues associated with PPPs that can and do lead to intense public debates about protection of the public interest. In most cases, public-sector rules governing procurement processes and contractual terms require revision to provide a secure legal framework for PPP arrangements.

Types of Public-Private Partnerships

PPPs have been used on a wide variety of transportation projects, especially in the transit and highway modes, and the terminology used to describe the various types of PPP agreements can be confusing. The Federal Highway Administration (FHWA) has been active in defining PPPs and in providing guidance for their use on highway projects. The following discussion is based on a classification system developed by the FHWA. (A source citation for this is provided below.)

Construction of New Facilities. PPPs formed to build new facilities (freeways, rail lines, etc.) can be structured in three ways:

- design-build;
- design-build-operate-maintain; and
- design-build-finance-operate.

Design-build is a project delivery method through which a public agency executes a single, fixed-fee contract for both architectural/engineering services and construction. The design-build entity may be a single firm, a consortium, joint venture, or other organization assembled for a particular project. In a design-build partnership, the private-sector entity is responsible for the design and construction phases of the project, while the public agency is responsible for the financing and subsequent operation and maintenance of the new facility.

In a design-build-operate-maintain PPP, a private-sector entity (firm, consortium, joint venture, etc.) is responsible for the design and construction phases of the project and also for operation and maintenance once the project is built, usually for a stated period of time.

In a design-build-finance-operate PPP, significant authority is delegated to the private entity, which will not only undertake the design and construction work and accept responsibility for operation and maintenance, but will also provide a portion of project financing. These are becoming more common for toll roads, rail transit lines, parking garages, and other revenue-producing transportation facilities. These PPP contracts have a stated term or duration. In most but not all cases a public agency retains the underlying ownership.

Existing Facilities. PPP agreements are also used to provide for operations and maintenance of existing facilities. Such PPPs are generally structured in one of two ways: as an operations and maintenance concession or as a long-term lease. In an operations and maintenance concession, a private-sector entity is hired by a public agency to oversee operations and maintenance of a capital asset and may have other management and public service responsibilities.

Transportation facilities that generate revenues can also be leased through PPPs to a private-sector entity that pays an upfront fee to lease a publicly-financed facility from the public agency for a specified length of time. The private-sector entity is authorized to collect tolls or fares on the asset while overseeing its operation and maintenance. This arrangement places greater responsibility on the private sector for the public service performance of the facility.

Hybrid PPPs. A variety of other PPP structures have been developed. In one scenario, a PPP may be arranged in a lease-develop-operate structure, whereby a private-sector entity is granted a lease to operate and expand an existing facility and can expect a return from the investments at the end of the lease. Other PPPs include build-own-operate, build-operate-transfer, buy-build-operate, and build-develop-operate. These partnerships are not often used for transportation facilities and may present challenging public policy issues.

Pros and Cons of Public-Private Partnerships

The use of PPPs in transportation has been the subject of some controversy and ongoing public policy debate, including as part of the pending surface transportation reauthorization legislation. Public-private partnerships are not appropriate for every project and the public agency issuing the agreement must be in a position to procure and manage the PPP responsibly. While the use of PPPs is clearly increasing, agencies considering venturing into this area should be aware that there are pros and cons related to PPPs. Arguments in favor of and against PPPs are described below. In general the assumption behind these is that competitive forces in the private sector give rise to greater creativity, more rigorous management, and reduced costs.

Accelerated Project Completion (pro). The public is accustomed to, but impatient with, delays in the completion of public infrastructure projects. Most design-build and other PPP contract types include specific completion dates that can be enforced through liquidated damages provisions and similar means. While such provisions also could be used in regular design and construction contracts (and are), the time savings in PPP projects come from rolling the entire process into a single agreement. Thus, while a transportation agency might have planning, design, and construction management departments that tend to operate through linear project development processes, private-sector companies are (arguably) less bureaucratic and better able to manage multiple tasks in parallel processes that can accelerate completion.

Reduced Project Costs (pro). When public-sector agencies put construction projects out for bid, most design decisions have already been made. Contractors bidding on the contract are limited in how much creativity and innovation they can bring to bear on the project. They can try to reduce the unit costs of project materials, or they can develop construction techniques that save time and labor. But when projects are put out for design-build competition, the potential range of innovations companies can bring to bear is substantially increased. This generally does result in lower total project costs. More importantly, when the design entity and the construction entity are the same, a motivation is created to seek cost savings through design that may not be present when these two functions are performed by different entities.

Innovation and Technology Sharing (pro). Government agencies can benefit from the private-sector innovation encouraged by PPP contracting. Techniques developed by companies to accelerate, streamline and simplify projects (leading to cost savings) can be adopted by public agencies for their other non-PPP projects and can be shared with other agencies and with companies in the private sector, with resulting expanded public benefits.

Control of Public Assets by Private Companies (con). Some of the PPP structures turn public assets over for management and operation by private entities, in some cases for long periods of time (decades). This opens the door to situations in which members of the public are dissatisfied with performance of the private company and have no direct recourse other than whatever performance measures were included in the original PPP contract. Even where performance is acceptable there can be a public perception that public assets have been turned over to private companies, leading to political pressure to undo the PPP agreement.

Private Collection of Tolls and Fees (con). Some PPP projects—such as toll roads and rail transit lines—involve the private collection of tolls and fees from the traveling public. In some cases the private entity retains these revenues as part of the business deal. This sets up a situation similar to that encountered with public utilities (electricity, natural gas, etc.), where prices charged to the public must be controlled somehow to protect the public interest without unduly interfering with the profit motive inherent in such PPP agreements. Of particular importance may be provisions governing the life of the agreement to prevent collection of tolls or fees long after the initial cost of the transportation asset has been recouped. On some PPP projects, the collection of tolls may be introduced in an area where such charges have not previously been collected. This may accentuate a tendency for the public to perceive that the PPP agreement is "unfair" or inequitable for certain users.

Environmental Protection (con). When public-sector design and construction activities are turned over to private entities through PPP contracts, issues associated with environmental protection can emerge and can be difficult to resolve. Whereas political processes surrounding public agencies guarantee at least some amount of access and accountability on traditional projects, a poorly-drafted PPP contract might have the effect of insulating the private-sector partner from accountability for environmental impacts.

Debt Financing Costs (con). In certain situations, PPP projects potentially can be more costly than traditional public projects. Depending on the details of the PPP deal—and on current state and federal laws and regulations—the process of raising capital can be more expensive for a private-sector entity than it would be if the government directly borrowed the necessary money. Also, since government agencies do not attempt to earn a profit, a PPP arrangement can increase costs simply because a profit margin is necessary to attract private-sector partners to the deal. Although the assumption is that this is more than offset by PPP efficiencies, care must be taken to ensure that that is the case.

Examples

The following are examples of transportation projects completed through the use of PPPs. There are examples from each type of partnership, showing the variety of ways transportation projects are completed by agreements between the public agency and private sector.

E-470 Tollway, Denver, Colorado

E-470 is a 47-mile toll highway running around the eastern perimeter of the Denver metro area. It begins at State Highway C-470 at I-25 in Douglas County south of Denver, runs east and then north through Aurora, passes along the western edge of the Denver International Airport, and turns back towards the west, terminating at I-25 on the north end of the metropolitan area just south of 160th Avenue.

The project was sponsored by the E-470 Public Highway Authority and construction ran from 1989 to 2003. This project used the following PPP elements:

- Design-build procurement
- Privately held revenue bonds
- Private operations
- Accelerated joint interchange development
- Private snow removal

Hudson-Bergen Light Rail, Hudson and Bergen Counties, New Jersey

New Jersey Transit, the New Jersey DOT, and the Federal Transit Administration sponsored development of a 20.5-mile light rail line running along the Hudson River waterfront in Hudson and Bergen counties. The corridor includes 32 stations and five park and ride lots. The project was awarded to 21st Century Rail Corporation in 1996 and will be completed in 2010. A design-build-operate-maintain approach was used to shorten the development process by eight years.

Foley Expressway, Baldwin County, Alabama

This 13.5-mile-long toll road in Alabama includes a six-mile privately financed section and a 7.5-mile public section. The total cost of the project was $44 million, with $36 million being funded by private bonds. There is a $2 toll charged on the Foley Beach Express Bridge, which is part of the six-mile privately financed section.

DC Streets, Washington, D.C.

The District of Columbia Division of Transportation, in cooperation with FHWA, entered into a five-year, $69.6 million contract with VMS, Inc. for the maintenance of city streets, tunnels, pavements, bridges, roadside features, pedestrian bridges, roadside vegetations, guardrails, barriers, impact attenuators, and signs in Washington, D.C. The operating concession also includes citywide snow and ice control responsibilities. The contract, running from 2000 to 2005, was the first urban application of street maintenance outsourcing to the private sector. The maintenance contract was performance-based and required the contractor to apply asset management practices with the goal of using innovative methods and procedures for maintenance. Rather than define maintenance practices, the contract set up performance measures, leaving open the potential for private-sector innovation and cost savings.

Chicago Skyway

The Chicago Skyway is a 7.8-mile elevated toll road connecting I-94 in Chicago to I-90 at the Indiana border. In 2004 the City of Chicago awarded a 99-year concession to Cintra/Macquarie, who bid $1.83 billion dollars to assume operations of the skyway and the right to fare revenues. Skyway Concessions Company, LLC (SSC) was selected to act as the operations company, to take responsibility for maintenance costs, and to retain toll and concession revenues. This agreement between SCC and the City of Chicago was the first long-term lease of an existing toll road in the United States.

Pocahontas Parkway, Greater Richmond, Virginia

Construction began on the 8.8-mile Pocahontas Parkway in 1998. The roadway opened to traffic in stages beginning in 2002. The Virginia DOT entered into an Amended and Restated Comprehensive Agreement with Transurban, who has an Asset Purchase Agreement with the Pocahontas Parkway Association (PPA). Under the terms of those agreements, Transurban has acquired the sole rights to enhance, manage, operate, maintain and collect tolls on the Parkway for a period of 99 years.

Suggested Websites and Research Reports

The following websites and research reports are available online for more in-depth discussions of public-private partnerships.

The Federal Highway Administration maintains a website that is generally pro-PPP, but provides useful information, including the PPP classification system used above and the project examples: http://www.fhwa.dot.gov/PPP.

An interchange on the Pocahontas Parkway.

The National Council for Public-Private Partnerships maintains another pro-PPP website: http://www.ncppp.org. A report "For the Good of the People: Using Public-Private Partnerships to Meet America's Essential Needs" (2002) is available on this website at http://www.ncppp.org/presskit/ncpppwhitepaper.pdf.

U.S. Department of Transportation. Report to Congress on Public-Private Partnerships. 2004. http://www.fhwa.dot.gov/reports/pppdec2004/#2b

Werner, Frederick J. Public-Private Partnerships: Introduction to PPPs. Federal Highway Administration – National Resource Center. 2006. http://www.thetbwg.org/meetings/200612/Fred%20Werner%20-%20Intro%20to%20PPPs.ppt

PPP contracts that privatize roadways have come under extensive public policy scrutiny. A report on this subject was put out by the U.S. Public Interest Research Group's Education Fund in 2007. This may be found at: http://www.uspirg.org/home/reports/report-archives/transportation/transportation2/road-privatization-explaining-the-trend-assessing-the-facts-and-protecting-the-public.

Public Transit Boosts Property Values, If Conditions are Right

Public transit can increase the development potential of real estate near high-capacity transit lines and stations, and thereby increase property values. This "transit premium" can range from as little as a few percent increase to over 150 percent. The amount depends largely on the local regulatory environment, regional connections, and national and regional economics. Achieving the potential for this increased value of property also generally requires building more complex, mixed-use projects at higher densities, which entails higher costs of development and higher risks. Developers will be more likely to take on those risks if other transit-oriented development projects in the city have already succeeded. Unbridled, subsidized development in suburban and rural areas around a transit city also prevents transit stations from enhancing property values.

Over the past four decades cities in the United States (with federal assistance) have invested heavily in high capacity urban public transit systems—commuter rail, metro rail, light rail, and bus rapid transit. Now it appears there will be a renewed federal, state, and local interest in intercity passenger rail and even in high speed rail. Cities from Washington, D.C. to Dallas to San Diego to Portland have seen their transit systems spur robust development and redevelopment in association with these transit systems.

It has become clear that public transit can increase the development potential of real estate near stations and transit lines, and as a result can increase property values. However, the extent of this cause-effect relationship is affected by many factors and conditions. Accurately anticipating the impacts of transit investments on property values requires understanding not only the local development markets but the nature of the relationship between public transit and land values.

Development around High-Capacity Transit

The term used to describe infill development, redevelopment and new development associated with public transit stations and lines is "transit oriented development" or TOD. A growing research literature (coupled with a rapidly-advancing professional planning and design practice) has been associated with TOD (see "Developers Are Building More Walkable Neighborhoods Around Transit Systems"). Billions of dollars of transit investment and associated private sector development investment have clarified the transit-development relationship.

A first step in addressing this topic is to focus on high-capacity transit. Not every kind of local public transit service generates a development response or increased land values. Most transportation planners believe bus transit routes do not attract significant land development investments. This is true in part because bus routes are perceived as impermanent services that could change to other locations and in part because of our cultural history, which has led to an association between bus transit and low-income and disadvantaged populations. Although this perception is generally inaccurate and outdated, we still do not see significant land development or investment as a result of bus transit services.

"High-capacity transit" is a term used for public transit systems that offer significantly higher travel speeds and ridership capacity than traditional urban bus services. For most practical purposes, four transit modes are included in the definition of high-capacity urban transit: commuter rail, metro rail, light rail, and bus rapid transit.

Commuter Rail. Commuter rail is a type of passenger rail transit service that operates between suburban areas and metropolitan centers and is intended primarily (but not exclusively)

to carry travelers commuting to work. Most commuter rail equipment is designed to operate safely on the same tracks that freight trains use. In the United States most commuter rail systems use diesel-powered locomotives, but in Europe most are powered through overhead electric lines. The locomotives are driven by human train operators and pull (or push) two to six passenger cars. Commuter trains operate at speeds up to about 125 m.p.h. Commuter rail lines tend to be longer than other types of urban rail transit, with corridor lengths ranging from 10 to 125 miles. Stations are spaced farther apart than other rail transit modes, with stations commonly placed at one to three mile intervals in developed areas and longer spacing on sections away from city centers (up to 15 miles in some locations).

Metro Rail. The term "metro rail" describes a type of rapid rail transit that operates in a grade-separated envelope, either in subway tunnels or on elevated structures (or both). Metro systems are the oldest type of high-capacity transit. Much of London's initial system was originally built in the 1860s. The technology spread quickly in Europe and also came to several of the larger U.S. cities, with the first U.S. system installed in New York City in the 1860s (initially using steam locomotives). Later these systems were electrified to solve the problem of coal smoke from the locomotives. Today, metro systems operate in many U.S. cities, including New York City, Washington, D.C., Atlanta, Miami, Philadelphia, Chicago, and San Francisco. Most metro systems draw electric power from "third rails" that carry high voltage alternating current that is deadly to humans. They tend to be high-capacity systems with hourly passenger capacities over 25,000 and potential operating speeds over 55 m.p.h. Most but not all metro systems use steel wheels on steel rails. Some metro systems have human train operators while others employ automated train control systems. Metro stations are generally spaced at half-mile to two-mile intervals, although this can vary widely depending on the density of the operating environment.

Light Rail Transit (LRT). LRT refers to a class of urban rail transit that is faster (up to 65 m.p.h.) and of greater capacity than streetcar or tram systems, but slower and of less capacity than heavy rail or metro systems. The use of the word "light" is a misnomer since light rail vehicles (LRVs) are not necessarily lighter in weight than vehicles used by other modes. LRT systems draw electric power from overhead wires and operate in exclusive rights of way, although some lines may operate for short distances on streets in mixed traffic. LRT lines may use low-floor vehicles or may board from high platforms. LRVs are designed with motors in each vehicle enabling operation either as single vehicles or in multivehicle trains and are controlled by human train operators. They are generally designed with full functionality for travel in either direction. LRT stations are generally closer together than commuter rail stations, with station or stop spacing ranging from a few hundred feet up to two miles. LRT has been the most popular form of urban rail transit in North America since the 1980s, with new systems implemented in many U.S. cities. Light rail systems have been credited with significant urban redevelopment benefits.

Bus Rapid Transit (BRT). BRT is a type of urban transit service where buses operate in exclusive travel lanes or "transitways" that separate buses from regular traffic. BRT operates at higher speeds than regular bus service and combines some of the characteristics of rail transit with some of the flexibility of bus service. Most BRT systems also employ other advanced technologies, infrastructure, and operational investments to provide a higher level of service than is possible with traditional bus service. BRT systems use "stations" or platforms much like those used for urban rail systems. Typical station spacing ranges from a half mile to two miles.

Other Transit Modes. Other transit modes operating in the United States include trams (streetcars), elevated people movers, and monorails. These are important transit modes with roles to play in our cities, but they are generally not as common and do not have the high-speed, high-capacity characteristics of the four modes described above.

The Impact of Transit on Property Values

The amount of the "transit premium"—value added to property by proximity to high-capacity transit—may vary significantly depending a number of factors. These factors have been analyzed in the research reports cited at the end of this paper. The table below was excerpted and reformatted from a report prepared by Reconnecting America for the Federal Transit Administration (see Resources).

Land Use	Transit Premium Range	
	Low	High
Single Family Residential	+ 2 percent within 200 feet of station (San Diego LRT, 1992)	+ 32 percent within 100 feet of station (St. Louis LRT, 2004)
Condominium	+ 2 percent within 2,640 feet of station (San Diego LRT, 2001)	+ 18 percent within 2,640 feet of station (San Diego LRT, 2001)
Apartment	0 percent to + 4 percent within 2,640 feet of station (San Diego LRT, 2001)	+ 45 percent within 1,320 feet of station (VTA LRT, 2004)
Office	+ 9 percent within 300 feet of station (Washington, D.C. Metrorail, 1981)	+ 120 percent within 1,320 feet of station (VTA LRT, 2004)
Retail	+ 1 percent within 500 feet of station (BART, 1978)	+ 167 percent within 200 feet of station (San Diego LRT, 2004)

The idea of a "transit premium" is an extension of location theory, which has a long tradition going back to work done by Johann Heinrich von Thünen early in the 19th century. Basically the idea of location theory as it applies to transit is that property values are increased by the directness of connections to other properties with synergistic land uses. The amount of this transit premium appears to be strongly influenced by the following factors:

- *Local Regulatory Framework.* The nature and extent of the relationships between public transit and nearby land uses depends greatly on the regulatory framework, including local government zoning ordinances, subdivision regulations, and other administrative requirements. In particular, the potential for transit-oriented development patterns and associated benefits for land values can be negated by inappropriate zoning such as single use districts. Many cities do not have workable mixed-use zone districts in their zoning classification systems or have severely restricted their use. Resolving this may require a rewrite of the zoning ordinance or development of a "TOD overlay district" to override limitations in the underlying zone district. Other regulatory barriers may include outdated street design standards that mandate high-speed auto-oriented streets inappropriate in urban, transit-served places.

  Many cities in the United States have been actively engaged over the past couple of decades in updating their ordinances and regulations to encourage the formation of vibrant, economically vital TOD districts, and there are many fine examples of urban institutional settings where TOD can succeed. Some cities, however, including those just now working on their first significant high-capacity transit lines, may not have adequately addressed this need yet. Until those issues are resolved, the potential for land value appreciation associated with transit lines in such cities may be limited. One particularly important factor influencing TOD economics is the local parking ordinance. Urban TOD districts should not be required to supply off-street parking at suburban ratios. Where this has not been addressed through a TOD zone district or overlay, the viability of TOD development patterns will be limited.

- *Regional Connections.* Research indicates that as the size of the area and population directly connected by transit to a given station location increases, the potential value added to nearby property increases. Regional high-capacity transit networks provide fast, direct connections between workforce populations and employment centers, and commuting is the largest category of urban transit ridership, especially on rail lines. Such networks also provide many other kinds of connections that generate business volume and increase property value proportional to the total area and population served. So single transit lines serving a small city or a small portion of a metro region will have less impact on property values than an extensive network of transit lines connecting an entire metro region.

- *National and Regional Economics.* Transit adds value in strong markets, but cannot "swim against the tide" in weak economic conditions. The health of the national and regional economies is obviously critical to the timing of TOD land acquisition and TOD development projects. The benefits of a TOD location will probably not outweigh the effects of a general recession such as the country faced in 2008 and 2009. Similarly, transit cannot overcome the basic structure of regional economies or the inherent characteristics of local development markets. If office space is overbuilt in a region, then office space in a TOD area may perform poorly. It might outcompete other new office space, but the amount of the "transit premium" may be small and the viability of the development may be questionable.

Cost of Development and Risk

Achieving the potential for increased value of property in a transit-oriented district generally requires building more complex (mixed-use) projects at higher densities. Such projects naturally entail higher costs of development and higher risks. In many places, the per-square-foot cost of multistory buildings and structured parking is significantly higher than the cost of low-rise buildings with surface parking, even taking into account the cost of the land. Until property values and rents are high enough to tip the balance toward vertical development, such projects will not be feasible.

So one of the impacts of the transit premium is to make mixed-use, high-density projects potentially more profitable than they would be in the absence of transit. But while this can increase the total return on an investment in TOD property, it also makes the development of a TOD site inherently more risky due to the higher costs of development. Local governments wishing to encourage mixed-use, high-density development near their transit stations should take steps to help developers manage and limit the costs and risks associated with such projects.

One of the most important strategies for reducing the costs of TOD development is the adoption of appropriate parking supply requirements. The reduced parking demand associated with dense urban development—and with TOD in particular—offers significant potential cost savings by reducing the amount of high-cost structured parking required.

Out-of-date suburban parking ordinances that require four new off-street parking spaces for every 1,000 square feet of commercial space, or two parking spaces for every apartment, will present a major barrier to TOD development. Revising the parking requirements for TOD projects through a shared parking provision or a TOD zoning overlay district can reduce the cost and risk of TOD projects, which in turn can increase the size of the "transit premium."

Another factor that can affect development cost and risk is the tendency for speculation in TOD property to occur early in the life of a transit line, long before the transit line opens. A run-up in land prices associated with TOD speculation can actually discourage transit-oriented development because the inflated land costs require higher returns from development than may be possible in a regional economy. This appears to have happened in the Midtown area of Houston along the Red Line and is occurring now in the Denver region around stations on the 113-mile FasTracks rail system. An interesting side effect of this can be seen where transit-induced development occurs near, but somewhat removed from transit stations (due to less speculation and lower land costs) before development occurs adjacent to the same stations.

Competition with Suburban and Rural Development

One sure way to discourage TOD development and to thwart enhanced property values around transit stations is to allow unbridled, subsidized development in suburban and rural areas around a transit city. For many years following the opening of the MARTA metro-rail system in Atlanta, lands near the MARTA stations failed to appreciate significantly in value and dense development failed to occur. In fact, throughout much of the 1980s and early 1990s, the MARTA experience was frequently cited as "proof" that urban development would not respond to public transit investments.

The underlying arithmetic is simple. Land at the fringe is usually much less expensive than land at urban locations near transit stations. And in many jurisdictions, transportation costs associated with "greenfield" projects are not fully assessed to the developer but rather are borne by state and local governments (in the absence of impact fees or growth management systems). In that kind of market, high-cost, vertical TOD projects on expensive land near transit stations will be competing against simpler projects offering lower rents and prices elsewhere in the same region. The best example of a situation that was close to the opposite of Atlanta in the 1980s was Portland in the 1990s, where robust, coordinated regional growth management measures limited the availability of low-cost rural lands for development, increasing the pace of TOD development around stations on the expanding LRT network.

While there is room for debate about what are the best public policies in light of property rights and other issues, there is little doubt that high-density TOD projects (producing an associated "transit premium") are unlikely to occur where low-cost suburban and rural development is dominating the market with low rents and low property prices.

Local, Successful Predecessor Projects

Finally, it is important to acknowledge the role that previous successful projects play. Developers must manage risk carefully and are often reluctant to introduce a new "product" that has not been tested in a regional market. TOD projects are inherently risky (see above) and may require types of development that developers are not experienced at implementing. For example, many local developers specialize in residential projects or in a particular kind of commercial project. Such companies will be reluctant to pursue complex, vertical, mixed-use projects.

Similarly, even though most of today's financial institutions are part of large national conglomerates, their staffs are often local. Complex vertical projects with shared parking adjacent to transit stations may have little appeal to local bankers until there are some local successful examples. Because the "transit premium" cannot manifest itself until there is development interest in TOD properties, the amount of transit-added property value may be low in the early years of transit in a given city or region.

Case Study: Dallas Area Rapid Transit

The Dallas area transit agency—DART—manages a multimodal transit system with bus, HOV, commuter rail and light rail elements. The LRT system began operating in 1996, currently includes over 45 miles of light rail lines, and is being expanded. Ridership response to the LRT system has been strong and development response at transit stations has been robust.

A research team from the Center for Economic Development and Research at the University of North Texas conducted a study for DART that provided an assessment of the fiscal impacts of transit-oriented development associated with development of the Dallas Area Rapid Transit light rail system. The objectives of the research were primarily to estimate the fiscal impacts of TOD—property tax and sales tax revenues—but a necessary first step in estimating the fiscal impacts was estimating the property appreciation associated with proximity to the LRT stations. The analysis considered development near existing and planned light rail stations. The findings supported the conclusion that the transit-oriented developments associated with DART Rail stations offered substantial fiscal impacts for local taxing entities. The paper, entitled "Assess-

ment of the Potential Fiscal Impacts of Existing and Proposed Transit-Oriented Development in the Dallas Area Rapid Transit Service Area" may be downloaded at: http://www.dart.org/about/WeinsteinClowerTODNov07.pdf.

Case Study: Portland Streetcar

The metropolitan region around Portland, Oregon has been one of the leading places for transit-oriented development and innovation in the United States for the past three decades. The Portland MAX LRT line from downtown to Gresham was one of the early successful LRT projects in the United States and helped set the stage for many similar projects in places like Sacramento, St. Louis, and Denver.

Beginning in 1992 the city initiated development of a streetcar line connecting the main part of downtown with the Pearl District—an old warehouse and manufacturing area next to downtown. Ultimately the system was extended to the South Waterfront area and the Portland Aerial Tram. Further extension across the river into a multidistrict loop is underway now. The City has kept track of the development impact of the streetcar, with about $3.5 billion in new development occurring within two blocks of the streetcar alignment. A brief factual analysis of the impact that the Portland Streetcar has had on development and property values in the central city area of Portland Oregon, entitled "Portland Streetcar Development Oriented Transit" may be downloaded at: http://www.portlandstreetcar.org/pdf/development_200804_report.pdf.

Suggested Websites and Research Reports

The following are websites and research reports that are available for more in-depth discussions of the relationships between transit and property values.

A summary analysis of the relationships between transit investments (primarily rail) and nearby property values was included in a report prepared for the Federal Transit Administration by Reconnecting America. This report, entitled "Capturing the Value of Transit" (as well as several similar documents on related subjects) may be downloaded from the Reconnecting America website at: http://www.reconnectingamerica.org/public/reports?page=2.

An overview of practical TOD implementation, focusing on relationships between real estate development and various forms of transit, was prepared by Reconnecting America for the Local Initiatives Support Corporation: http://www.lisc.org/files/8185_file_phoenix_tod.pdf.

Transit has its greatest impact on mode share at large, mixed-use destinations that are also major employment centers. A paper documenting this relationship written by Dr. Gary Barnes at the University of Minnesota, entitled "The Importance of Trip Destination in Determining Transit Share," may be downloaded at: http://www.hhh.umn.edu/centers/slp/transportation/transreports/pdf/landuse_policy_address_congestion.pdf.

One of the factors that will influence property values near transit in the future is the impact that motor fuel prices have on choice of housing location. A thought-provoking white paper on the relationships between the market for suburban housing and gas prices, written by Joe Cortright for CEOs for Cities, entitled "Driven to the Brink: How the Gas Price Spike Popped the Housing Bubble and Devalued the Suburbs" may be downloaded at: http://www.ceosforcities.org/pubs_projects.

Further Reading

The following documents represent source material for the reports cited above. They are all readily available for download.

Cambridge Systematics, Economic Impact Analysis of Transit Investments: Guidebook for Practitioners, TRB Report 35, Transit Cooperative Research Program, Transportation Research Board (www.trb.org), 1998. http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_rpt_35.pdf

Diaz, Roderick B., Impacts of Rail Transit on Property Values, American Public Transit Association Rapid Transit Conference Proceedings Paper, May 1999. http://www.rtd-fastracks.com/media/uploads/nm/impacts_of_rail_transif_on_property_values.pdf

Parsons Brinckerhoff, The Effect of Rail Transit on Property Values: A Summary of Studies, Project 21439S, Task 7, NEORail II, 2001. http://www.reconnectingamerica.org/public/show/bestpractice162

Smith, Jeffery and Thomas Gihring, Financing Transit Systems Through Value Capture, Victoria Transport Policy Institute, 2006. http://www.vtpi.org/smith.pdf

Good Transportation Policy Must Plan for Induced Demand

"Induced travel demand" is the additional travel and traffic generated by improvements in transportation capacity and service levels. Induced travel demand results in new travel above and beyond the increase in travel that was originally forecast in the planning process, as a result of changes in travel route, travel mode, time of travel, amount of travel, and location. Transportation planners have developed ways of predicting the induced demand that results from all of these changes. Governments should take induced travel into account in transportation planning.

REALTORS® are interested in existing property, of course, but there is also good reason for them to be interested in the development of new property and in community growth generally. New transportation infrastructure benefits communities, among other ways, by providing opportunities for real-estate development. Real estate development, in turn, often leads to an increased demand for transportation—whether in the form of new roads, expanded roads, or various kinds of mass transit.

The creation of new transportation infrastructure, however, often has the paradoxical effect of creating further transportation demand above and beyond that predicted in the planning process. This phenomenon is known as "induced travel demand": the additional travel and traffic generated by improvements in transportation capacity and service levels.

Induced demand is a multimodal concept; the phenomenon occurs with motor vehicle traffic, public transit ridership, and walking and bicycling. The idea is that when roadways are widened (or faster transit is implemented) people choose to make more trips or travel farther than they did before.

But the fact that induced travel demand tends to work against the desired efficiency of newly developed roads or mass transit does not mean that the creation of new transportation infrastructure should be avoided. Demand for new transportation cannot simply be ignored. Instead, planners must take induced travel demand into account as they decide what kinds of new transportation are necessary. At the same time, they should take advantage of transportation demand management (see "Managing Transportation Demand Puts Livable Communities Within Reach") to make sure that shifts in the use of one kind of transportation are properly balanced by accompanying shifts in other kinds; and they should adjust land use plans to alter traffic as desired.

What Causes Induced Demand?

Induced travel results from two primary factors. First, in most places today there is a significant amount of latent demand for travel—trips that people do not make because they will take too long or cost too much. For example, a skier might decide not to ski on a certain Saturday knowing that the highway leading to the ski resort will be crowded. Or a family might choose a less desirable daycare facility because it is close to their home whereas a better daycare would require too much driving and increase the cost of gasoline. If transportation improvements are made (widening the highway to the ski resort, or building a light rail line that provides access to the more distant day care facility) people may decide to make trips they previously avoided, or to make longer trips, both of which would increase total travel.

Second, in a growth environment where new homes and businesses are being built, "live and work" location choices take into account current and future travel times, congestion and similar factors. One effect of a new roadway or transit line is reduced travel times in specific corridors, encouraging the development of new homes and businesses farther from existing city centers.

Induced travel is a public policy concern for several reasons. By generating additional traffic, a widened highway might provide much less congestion relief for existing travelers than was expected, raising questions about whether the investment was beneficial. By providing high-quality, high-speed access to areas outside a city, a commuter rail line might encourage

suburban growth far from jobs and services (paradoxically increasing auto traffic). For many years, as settlement moved westward across the country and later as we built our cities and suburbs, increased travel was seen in positive terms—a sign of progress. But today, with rampant highway congestion, high cost of travel in family budgets, a national dependence on imported petroleum and emerging issues associated with climate change, we are more likely to question the wisdom of inducing new travel. Serving new travel demand is one thing; causing it might be something else entirely.

Sources of Induced Demand

There are five primary sources of induced travel demand. These apply to all modes (auto, transit, pedestrian, bicycle), but only auto and transit induced travel have been studied extensively. They are presented here in the context of auto travel for purposes of simplicity.

Changes in travel route. The roads and streets of an area comprise a network. We tend to ignore this fact and focus only on specific corridors, or even just on specific segments of corridors, but every street is connected into a larger network. Some networks are more complete than others, but in most networks there will be alternative parallel routes for any specific corridor we might consider widening or otherwise "improving." When average speeds (or travel flow) are increased (by reducing congestion, or by eliminating intersections, etc.) daily traffic on the local network will readjust to the new condition. Part of that adjustment process includes the shifting of travel from alternative parallel routes to the newly improved route. This occurs very quickly, often in a matter of days.

Changes in travel mode. The relationship between the travel times of different modes is an important factor in determining the "mode share" in an area or in a corridor. (Mode share is a term used to describe the percentage of trips made by each mode.) One sure way to increase transit mode share is to speed up transit connections between a set of origins and destinations by implementing express bus service, installing special bus lanes, or building a rail line. Conversely, when investments are made in a street or highway to increase traffic flow and speeds, the result can be a shift from transit back to driving. This is referred to as an induced mode shift. Similarly, one reason people carpool is to alleviate the difficulty of making long trips in congested corridors by driving alone. However, the extension of a new freeway without HOV lanes can reduce the incentive to carpool, raising the single occupant vehicle (SOV) mode share and increasing traffic.

For walking and bicycling, trip length is an important factor in potential mode shifts. People will walk or bicycle only relatively short distances for most trips (generally less than a mile for walking and less than five miles for bicycling). So the tendency for travelers to shift travel mode in response to changes in traffic corridors is limited to shorter trips for the pedestrian and bicycle modes. However, pronounced mode shifts away from walking and biking can occur where the impact of road construction is to make walking and bicycling less safe and convenient—a common outcome.

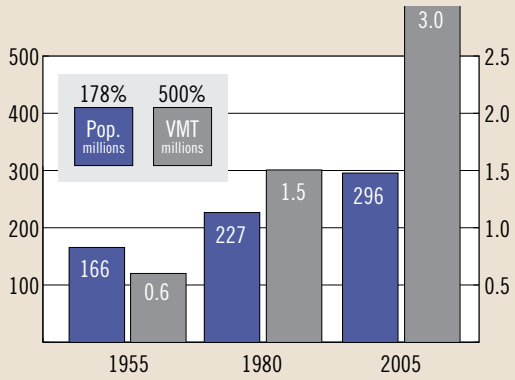
Changes in time of travel. In small cities and young suburban areas, traffic flow peaks during daily "rush hours"—usually 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. However, in larger cities and metropolitan regions, this peaking effect is spread over longer periods of time. This occurs because as traffic grows and congestion increases, some travel during peak periods is discouraged. Popular perception is that rush hour traffic is made up primarily of commuters going to work or going back home from work. Actually, however, in many cities commuting represents less than 25 percent of daily travel and less than 50 percent of traffic in the afternoon peak period.

The remaining travel—shopping, social and recreational travel, deliveries, school-related trips and so forth—represents "discretionary" travel for which drivers have more flexibility to choose their time of travel to avoid congestion. In congested areas, some of these trips shift to "shoulder periods" earlier in the afternoon or later, in the early evening. As a result, in larger urban areas, the afternoon "rush hour" actually lasts as long as three to four hours. When highways are widened or new freeways are built, some of that shoulder travel shifts back into the peak period. Because most traffic engineering is focused on providing capacity for peak travel periods, this time shift is an important form of induced travel that causes the public and policy makers to seek further street and roadway expansion. This is troubling to traffic engineers who know that concentrating traffic in peak periods represents an inherently inefficient use of the public's roadway investment.

Changes in amount of travel. Humans are inherently mobile beings—a result of shared DNA reflecting our heritage as hunter-gatherers who roamed over large areas daily and seasonally. And, our society and economy require high levels of mobility and transportation service to run the way we want them to. As a consequence, there is almost always a significant amount of latent demand for travel, even in rural places. What prevents latent travel demand from becoming actual travel is primarily time and cost. So when travel times are reduced by construction of new routes or delay is (temporarily) reduced by widening or otherwise improving existing routes, some of the latent demand for travel becomes actual travel.

This conversion of latent demand to new traffic is a major source of induced travel. To get some idea of how significant it is, the graphic below shows the growth in U.S. population and in total U.S. daily vehicle miles of travel (VMT) over the

United States Population & VMT



past half century. This substantial increase in per-capita VMT is in part a result of roadway investments and induced travel.

Changes in location. Every day in the United States millions of "location choices" are made: where to live, where to work, where to send the kids to school, where to shop, where to invest in commercial real estate, where to lease office space, and so forth. Since at least the 17th century economists have known that access, connectivity, travel distances, and travel costs play major roles in determining land values and development potential. When new transportation facilities are built that improve connectivity or reduce travel times, they "open up" new areas for development. When freeways or commuter rail lines are extended out from cities, new possibilities are made available to people for places to live and work. As we now know, one result of the past hundred years of transportation investment in this country has been the expansion of suburban and exurban development, including new residential subdivisions and commercial sites farther from existing city centers. For most of our history, this has been seen as a good thing—as progress. However, the irony that many people are beginning to see is that much of this investment was originally justified to "alleviate congestion" in existing corridors for existing travelers. In practice, however, the induced travel associated with location decision-making has consumed much or all of the new capacity in many if not most of these corridors.

Measuring and Forecasting Induced Demand

In order for cities and regions to grow according to plan, it is important for planners and policy makers not only to understand induced travel demand but to be able to quantify and forecast it. In fact, most transportation planning and most urban land use planning has ignored induced demand. This has occurred in part due to the structure of the planning process and how transportation investment decisions are made. It has also in part been due to technical shortcomings, which are described below.

Changes in travel route. The redistribution of traffic over a network in response to changes in capacity and travel speed in certain corridors is something we know how to estimate. In fact, almost any city or urban region has the capability of doing this using "traffic models" that are readily available and in general use. (See text box.) However, many roadway projects are planned and designed as corridor improvements, ignoring their impacts on the larger network. Federal transportation policy has discouraged this myopic approach for major projects since at least 1991, but many smaller projects—especially the widening of arterial intersections—escape the planning process without ever being subjected to network-level analysis or traffic modeling.

Changes in travel mode. It is common for large cities and metropolitan regions to develop more robust transportation models that forecast not only motor vehicle traffic, but also transit ridership. These more complex models include equations that predict how much travel demand will be captured by transit. (Usually such models are developed in connection with planning for rail transit systems.) Theoretically, these models could be used to forecast the reverse change—the increased capture of travel demand by the automobile mode in response to improved traffic speeds and reduced traffic delay. In practice, this is almost never done. So mode share analysis is done in connection with evaluation of future transit investments (where federal policy requires it), but not in connection with evaluation of future roadway investments (where federal policy does not require it).

How Traffic Models Work

Transportation planners forecast travel demand in response to land uses using computer software that we refer to as "traffic models." Planners input population forecasts and other demographic data into the models, assigning the numbers to "traffic analysis zones," and then estimate the travel demand that will result. Algorithms are used to assign these trips to a network, resulting in forecasts of future traffic in specific corridors.

Changes in time of travel. Most urban transportation demand analysis (traffic modeling) focuses on "peak travel periods." Thus, the evaluation of traffic demand in relation to roadway capacity addresses a PM peak hour or a PM peak period (e.g., 4 p.m. to 6 p.m.). In virtually all cases, the percentage of travel occurring in this peak travel period is static in the traffic model: once estimated, it is not later adjusted. So although we know

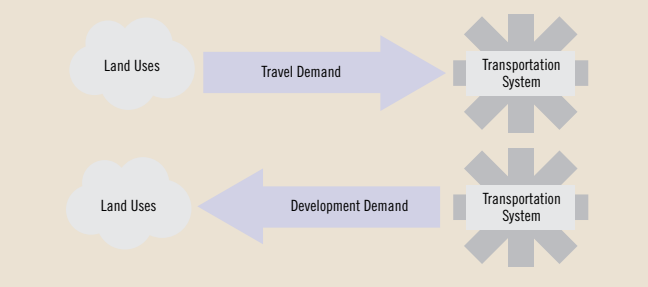
that people adjust their time of travel in response to congestion and delay, we generally do not take that fact into account in designing our traffic models and forecasting travel demand.

Changes in amount of travel. An early step in the transportation planning process involves the estimation of "trip generation" associated with specific land uses. This is a significant characteristic of traffic models because it determines how much traffic the model predicts will be produced in the future based on forecast land uses. For example, a traffic model may be designed to predict that each single-family residential dwelling will "generate" eight daily vehicle trips somewhere on the network. Unfortunately, the trip generation inputs used in most traffic models are static and are not adjusted to reflect levels of congestion or other factors. In fact, many traffic models do not even use local data for trip generation, relying instead on national tables published by the Institute of Transportation Engineers or other sources. So although we know that there is latent demand for travel and that people will adjust how much they travel in response to congestion and other variables, we do not take that into account in designing our traffic models and thus we do not take this into account in developing transportation improvement programs.

Changes in location. The final category of induced demand is the impact of the transportation system on land development patterns and, then, the impact of land development patterns on traffic and travel. A number of specific factors are at work here. At the most obvious level, when a commuter rail line or freeway is extended into the countryside outside a city there will be increased demand for residential development near the stations or interchanges. Of course, other more subtle forces are also at work. For example, if a state Department of Transportation has rigorous rules and procedures governing access management (the addition of new driveways and intersections), that will shape how commercial development responds to highway corridor investments. There might be less of a tendency for commercial strip development to occur, which might in turn encourage more of a village pattern for commercial businesses, which in turn will affect where traffic goes.

However, the major factors driving induced demand will be the influence of new or expanded facilities on where people choose to live, where employers locate new office complexes or industrial facilities, and where commercial enterprises choose to locate stores and businesses. These in turn will produce new traffic at new locations that will consume at least part of the new capacity provided by the new or expanded facilities.

The figure below depicts this dual nature of the transportation-land use relationship. We know that land use drives transportation demand. But at the same time, expansion of the transportation system influences development.



Transportation planning in the United States generally takes account of the upper set of relationships but not the lower. We can readily predict how the transportation system will respond to land use patterns because we control the outcome: we decide publicly what corridors to build, where to provide interchanges and so forth. It is more difficult to forecast how development trends will respond to transportation investments. The response of land development patterns to transportation investment is the sum of many decisions made by many land owners and developers. These decisions are influenced not only by transportation spending, but by economic conditions, land use characteristics (topography, etc.), and other infrastructure programs (especially sanitary sewer line placement), as well as by a wide range of poorly understood factors—culture, development inertia, mortgage lending trends and so forth.

Policy Implications of Induced Travel Demand

At a time when relationships between vehicular travel trends and such issues as climate change, energy dependency, and air quality are increasingly important, the implications of induced travel demand have taken on greater importance. Most highway investment programs are presented to the public in terms of "congestion relief" or traffic alleviation. What if the actual impact of building new or expanded highways is to increase traffic and not to alleviate congestion?

The policy implications of induced demand are tied in part to the objectives of transportation investment in the first place. If the purpose of a particular project or program of projects is to increase land development or redevelopment in a particular area, then induced traffic would presumably be expected and accepted as an outcome. However, if a project or program is promoted based on congestion alleviation, that particular benefit may not be realized and the project or program may be judged to have failed.

Some researchers have taken pains to make it clear that even when the impact of a transportation capacity investment is to produce unanticipated development and induced traffic, someone may still benefit. For a short period of time, traffic may flow better. Maybe a landowner is able to sell land for development and use the proceeds to send family members to college. Perhaps housing con-

tractors will have more demand to build new houses and that will create jobs. So the policy implications of induced travel demand are complicated not only by technical challenges associated with measuring and forecasting but also by different perspectives on how desirable or undesirable the outcomes of induced traffic are.

Generally, policy makers can agree on at least one principle: local, regional, and state governments should take induced travel into account in planning and should make transportation decisions in the light of factual information about the secondary effects of transportation investments.

Examples and Resources

Blueprint Planning Processes

One of the more interesting and productive approaches to rationalizing transportation planning in light of induced demand considerations is the Blueprint Planning Process implemented by the State of California. Initiated in 2005, the Blueprint Planning process was designed to enable public officials and other participants to more realistically evaluate future land use patterns and their potential impacts on the region's transportation system, housing supply, jobs-housing proximity and balance, environment, and natural resources. This integrative approach to land use and transportation planning is also known more generally as "scenario planning."

California initiated a grant program to transportation planning regions of the state that was designed to create a planning process that would better inform regional and local decision-making through proactive engagement of all segments of the population to foster consensus on a vision and preferred land use pattern. Most importantly, the process was designed specifically to address potential land use responses to different transportation investment programs and the implications of resulting land development patterns for the efficacy of transportation investments. The process was also designed to take into account the regional nature of these issues by allowing and funding collaboration between neighboring regional transportation planning agencies. Some examples of Blueprint Plans produced through the California process can be found at these websites:

The Southern California Association of Government's "Compass Blueprint" process is described at http://www.compassblueprint.org/about/vision.

The Sacramento regional approach to Blueprint Planning is documented at http://www.sacregionblueprint.org/sacregionblueprint/home.cfm.

A useful overview of "scenario planning" can be found in a paper written by Keith Bartholomew at http://www.arch.utah.edu/bartholomew/SP_SummaryRpt_Web.pdf.

Further Reading

The following are websites and research reports that are available for more in-depth discussions of induced travel demand.

Cervero, R. 2001. Road Expansion, Urban Growth, and Induced Travel: A Path Analysis, University of California-Berkeley. http://www.uctc.net/papers/520.pdf

Fulton, L., Meszler, D., Noland, R. and Thomas, J. 2000. A Statistical Analysis of Induced Travel Effects in the U.S. Mid-Atlantic Region, Journal of Transportation and Statistics. http://www.cts.cv.ic.ac.uk/documents/publications/iccts00003.pdf

Goodwin, P. 1996. "Empirical Evidence on Induced Traffic: A Review and Synthesis," Transportation, Vol. 23, pp 35-54.

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Heanue, K. 1997. "Highway Capacity and Induced Travel: Issues, Evidence and Implications." Transportation Research Circular, Vol. 418, pp. 33-45.

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Litman, T. 2009. "Generated Traffic and Induced Travel: Implications for Transport Planning." Victoria Transport Policy Institute. http://www.vtpi.org/gentraf.pdf

Noland, R. 1999. "Relationships Between Highway Capacity and Induced Vehicle Travel." Washington, D.C. Paper presented at the 38th Annual Meeting of the Western Regional Science Association. http://www.preservationist.net/transportation/induced_travel/pdf/epa_induced_traffic.pdf

Noland, R. and Cowart, W. 2000. "Analysis of Metropolitan Highway Capacity and the Growth in Vehicle Miles of Travel." Washington, D.C. Paper presented at the 79th Annual Meeting of the Transportation Research Board. http://www.cts.cv.ic.ac.uk/staff/wp1-noland.pdf

Transtech Management, Inc. and Hagler Bailly. 2000. "Assessing the Issue of Induced Travel: A Briefing on Evidence & Implications from the Literature." Washington Metropolitan Council of Governments. http://www.entrancesolution.com/Text/Induced%20Travel.pdf

Practical Applications of Transportation Demand Management

Transportation demand management (TDM) programs have been around as major components of urban transportation systems since the 1970s and a significant body of knowledge has been built over this time. In practice, TDM programs range from light-duty marketing campaigns that accomplish little to robust, integrated systems that have measurable impacts on traffic volumes in specific corridors or districts.

Scale and Integration

One of the keys to successful TDM programs is understanding how to manage the scale of TDM programs and how to work within a complex urban environment with multiple agencies and organizations interacting, sometimes with competing goals.

Different TDM measures are appropriate for implementation by different entities at different scales. There is little a single employer can do to improve regional public transit service, for example. Regional transit agencies with regional tax bases provide transit service and they typically participate in ancillary programs designed to promote transit patronage, including setting up pass programs. Cities within those transit regions may be represented on the transit board and can influence transit decision making. In some cases, cities may operate local circulators and shuttles as adjuncts to the regional transit system. Groups of employers, operating through a Transportation Management Association (TMA), can implement an employee transit pass program, sharing costs and creating an efficient marketing effort with an information clearinghouse. They can work with the transit agency and city to obtain better service or improved transit stops near their worksites, or to run a local circulator. In many cases, the state department of transportation or a metropolitan planning organization (MPO) may have funds available to help start up TMAs and to support their efforts. In fact, many metropolitan areas have a regional commute trip reduction program designed to provide services and resources to TMAs.

Successful deployment of a regional transit system to reduce driving by commuters entails vertical integration and cooperation among these different entities. This principle applies

not just to transit, but to other kinds of TDM systems and services. In design of any type of TDM program, it is important to map out vertical and horizontal relationships and to target resources strategically to those measures that realistically fall within the influence of the implementing entity. This requires collaboration and coordination among private companies and public entities. It also benefits from open communication. While there are many reasons why private employers can and should compete with each other, TDM programs are inherently cooperative in nature. Success requires that the entities involved work together to build the scale of effort required to achieve measurable results.

So, what a single employer can do is: help form a TMA, participate actively in that TMA, lobby the city and transit agency for better transit service and other support, and then work to ensure that employees are aware of their transit options and have ready access to transit passes and other program features, perhaps by implementing a parking cash-out or transportation allowance as part of an employee benefits package.

Measurement and Reporting of Results

TDM programs cost money that could be invested in other things. To ensure that programs have continued support, whether from public boards and elected bodies or from the managers of private companies, it is essential to describe program objectives and expectations in measurable terms and then to monitor and report outcomes.

Most successful TDM programs have well-structured systems of objectives and performance measures that are reported monthly, quarterly, and annually. The best monitoring systems include outcomes (such as trips reduced) as well as diagnostic information (such as percent of employees with transit passes). These data, coupled with cost reporting and a frank assessment of program performance, enable program managers to improve the program steadily and also ensure continued support for the required investment from management.

Measurement and reporting systems for TDM programs vary widely, but common elements of most programs report results using such measures as:

- Average weekday transit ridership
- Mode share (percent of trips made by driving alone, carpooling, transit, walking, bicycling)
- Traffic levels in specific corridors, at entrances to worksites, or across cordon lines
- Number of participants signed up for parking cash-out or transportation allowances
- Peak observed parking demand
- Various financial measures of program costs and revenues

The most common measure of TDM results is stated in terms of vehicle trip reduction. This is useful because it focuses directly on what is normally the most important objective—managing traffic congestion. To measure and report vehicle trip reduction, it is necessary to set a benchmark or baseline that is based on actual measurement of the current situation or status quo. This normally includes counting vehicles at preset locations and surveying employees or other travelers to determine travel behavior.

In setting objectives, scale is important. A 40 percent transit mode share for commute trips into a downtown or major employment center is achievable assuming good transit service coupled with a smart TDM program. However, for all trip purposes citywide a 4 percent transit mode share would be considered high in most U.S. cities. Large office parks with good transit service and congested highways—say, in San Francisco or Seattle—have achieved commute trip reductions of as much as 55 percent to 60 percent. But a high percentage of employment in most regions works in small companies where TDM programs may be less effective, so regional commute trip reductions, even with highly successful programs, are generally less than 10 percent.

Generally, it makes sense to set modest objectives and to design an initial program that integrates multiple TDM measures to achieve those objectives. Then, following annual reporting and analysis, the implementing entity should focus in on those strategies that appear to be working and also diagnose why others are not working. Over time a good TDM program is a learning system that improves and becomes more efficient.

TDM programs are generally designed to "reduce traffic" or "manage congestion." Measuring their actual performance toward these objectives must take into account the fact that what these programs do is build on the performance of other programs.

Take, for example, a company that provides transit passes and offers an employee transportation allowance program designed to encourage transit ridership. This employer program is making use of transit investments made by others. In this case, there may already have been some transit ridership before the company instituted the program and the actual impact of the program would be to increase the amount of transit ridership. Measuring the performance of this program would require establishing a baseline measurement prior to program implementation so that the amount of change could be measured. It would also be important to acknowledge that many other factors could also be changing during the measurement period, such as the level of transit service being provided, the price of gasoline and so forth. Good measurement systems would explicitly note and document these other factors and their likely effects.

Measurement and reporting systems may focus on a specific type of travel. For example employers will measure "commute trips" to and from their worksite. Cities may measure all daily travel by residents, or all commute travel by people employed within their city. Downtowns and other activity centers may measure travel behavior by trip purpose, separating work trips from shopping trips. Potential outcomes for different potential frames of measurement are summarized below.

Employers. In urban regions where good transit service is available directly to the worksite, arterial streets are congested during peak hours, and walking and bicycling are safe and convenient, large employers can sometimes show commute trip reductions (reduced auto trips by employees) above 50 percent. By contrast, small employers in suburban locations with little transit service and poor walking and bicycling environments would have to rely entirely on carpools and might succeed in reducing commute auto trips by only a few per-

centage points. Table 1 shows the commute trip reduction objectives that the Seattle region's Commute Trip Reduction (CTR) program has set for large employers (over 100 employees). The program sets objectives to be reached within a set number of years following company formation or after otherwise qualifying under the CTR regulations.

Table 1. Seattle Region Commute Trip Reduction Objectives

Vehicle Trip Reduction	Within
15%	2 years
20%	4 years
25%	6 years
35%	12 years

Office Park or TMA. Office parks or groups of employers within a defined geographic area often work through a TMA to achieve results similar to those shown in the table above. However, in many urban regions the results at this level would be more modest, with many TMAs reporting commute trip reductions in the 10 percent to 25 percent range.

Municipality. Some cities around the United States have set trip reduction or similar objectives and are monitoring and measuring their progress. One of the earliest cities to adopt a citywide TDM program was the City of Boulder, Colorado, which established its "GO Boulder" (Great Options) program in 1990. Boulder's population today is just over 100,000, which is a manageable size for such a program—large enough to deploy a sophisticated demand management effort, but small enough to have meaningful city-wide TDM program administration. Data from Boulder's monitoring program is shown in Tables 2 and 3.

Table 2. Boulder Resident Mode Share—Percentage of All Trips

Mode	1990	2006
Single Occupant Vehicle	44.2%	38.4%
Multiple Occupant Vehicle	26.3%	25.0%
Pedestrian	18.2%	18.9%
Bicycle	9.1%	13.6%
Transit	1.6%	4.0%
Other	0.4%	0.1%
TOTAL	100.0%	100.0%

Table 2 provides data for residents of the city and all trip purposes, using the common "mode share" measurement based on a resident travel diary administered as a random sample survey. Table 3 provides data for the commute travel behavior

of people who hold jobs in Boulder, some of whom live outside the city.

Boulder is an unusual place; these results might not be achievable in many cities. The high walk/bike mode share shown in Table 2 (32.5 percent in 2006) reflects the City's investments in walking and biking infrastructure, but also reflects the presence of the University of Colorado campus with almost 30,000 students attending classes.

Table 3.
Boulder-Based Job Commute Mode Share—Percentage of All Trips

Mode	1991	2006
Single Occupant Vehicle	73.0%	66.6%
Multiple Occupant Vehicle	11.8%	8.0%
Pedestrian	3.5%	3.0%
Bicycle	8.4%	6.9%
Transit	1.7%	7.8%
Multiple Modes	NA	5.3%
Work at Home	1.6%	1.9%
Other	NA	0.5%
TOTAL	100.0%	100.0%

The remarkable increases in transit mode share—both for resident trips and for work commutes—resulted from an ambitious expansion of transit service funded in part by the City through its Community Transit Network, which augments the services of the Regional Transportation District (RTD) with local, high-frequency bus routes. Probably the most important TDM measure initiated by the City (in coordination with RTD) is the Eco Pass program which provides discounted transit passes to companies that opt into the Eco Pass program.

Boulder's total non-single-occupancy-vehicle mode shares shown in Tables 2 and 3 represent performance that is near the upper end of what can be achieved in a U.S. city today.

The City of Portland, Oregon has established objectives for bicycle mode share as part of a city-wide effort to "make bicycle ridership a part of daily life in Portland." Although the City does not conduct a comprehensive survey like Boulder, Portland does undertake a "Bicycle Count" program that is calibrated against U.S. Census data. Portland's bike mode share objectives are shown in Table 4. As of 2008 the City believed it was on track to achieve the 2011 objectives. If it succeeds, this will set a new standard for bicycling in an American city.

Table 4. Portland Bicycle Mode Share Benchmarks (percentage of Daily Resident Trips)

Year	Inner Portland	Citywide
2001	5%	3%
2006	10%	6%
2011	15%	10%

Region. Most urban regions have significant transportation demand management programs designed to provide support to cities, TMAs, employers and commuters. These regional programs are often housed at a Metropolitan Planning Organization (MPO) or a Regional Planning Council (RPC). Many MPOs and RPCs conduct periodic travel behavior research projects to monitor personal travel in their regions. Typical reporting measures would include per capita daily vehicle miles of travel, single occupant vehicle mode share for commute travel (also available every ten years from Census data packages), and transit mode share. Table 5 provides data for the Seattle region published by the Puget Sound Regional Council.

Table 5. Puget Sound Regional Council—2006 Seattle Area Regional Mode Share

Mode	Work Trips	Non-Work Trips
Single Occupant Vehicle	80%	46%
Carpool, Vanpool	7%	44%
Public Transit	8%	2%
Bicycle	2%	1%
Pedestrian	3%	7%

Program Duration and Lifecycle

TDM programs are inherently operational in nature. They require continuing effort and long term commitment. If a TDM program is deemphasized or loses management focus, even for a short period of time, program performance will suffer measurable declines.

The durability of TDM programs is also affected by the changing cast of people involved in the programs. Even the most stable companies have employee turnover, including in the ranks of the people administering the TDM program. TMA employees also come and go. Elected leadership in most cities changes over time, which affects not just who holds office but also what policies are considered important and what programs are funded. Finally, actual program participants—the carpoolers, transit riders, and so forth—change jobs and housing frequently. For example, the average life of a carpool in some markets may be less than a year.

Consequently, a primary challenge in running a successful TDM program is maintaining satisfactory performance in the face of changing personnel, shifting priorities, and organizational inertia. At the scale of individual employers or office parks it is common for performance to peak after two to four years of effort and then to go into decline as priorities and attention are focused elsewhere. At the local or regional scale, policies and priorities migrate over time to new programs and new ideas sometimes leaving established TDM programs in their wake. For these reasons, transportation officials at all levels of government tend to be skeptical of the prospects for TDM programs to play a permanent or significant role in alleviating traffic or managing congestion.

Thus, an important design feature of any successful TDM program is the institution of long-term commitments and requirements that bind future agencies, employers, property owners and others to continued investment and active participation in the program.

Glossary of Transportation Terms

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO is a nonprofit, nonpartisan association representing highway and transportation departments in the 50 states, the District of Columbia, and Puerto Rico. It represents the five vehicular transportation modes: air, highways, public transportation, rail, and water.

Alternative Fuel Vehicles

Vehicles that run on "alternative fuels" (fuels other than gasoline and diesel fuel) including ethanol, methanol, compressed natural gas, electricity, hydrogen, liquefied natural gas, liquefied petroleum gas, biodiesel, and liquids made from coal.

American Public Transportation Association (APTA)

APTA is a nonprofit international association of over 1,500 public and private members including transit agencies, vehicle manufacturers, and other suppliers and contractors in the transit industry. Founded in 1882, APTA serves as an advocate for public transportation programs and initiatives in the United States.

Budgetary Firewall

A technique in the federal transportation program whereby spending for certain discretionary programs is capped to protect regular formula programs from the possibility that they might lose funding to those discretionary programs. In the 2005 surface transportation authorization legislation (SAFETEA-LU), highway and mass transit firewalls were established to protect certain highway, highway safety, and transit programs from having to compete with the discretionary programs through which specific projects are earmarked. Highway or transit program funding could still be reduced, but such reductions would not allow increases in discretionary programs.

Bus Rapid Transit (BRT)

A type of urban transit service where buses operate in exclusive travel lanes or "transitways" that separate them from regular traffic. BRT operates at higher speeds than regular bus service and combines some of the characteristics of rail transit with some of the flexibility of bus service. Most BRT systems also use other advanced technologies, infrastructure, and operational investments to provide a higher level of service than is possible with traditional bus service.

Commuter Rail

A type of passenger rail transit service that operates between suburban areas and metropolitan centers and is intended primarily (but not exclusively) to carry travelers commuting to work. Most commuter rail equipment is designed to operate safely on the same tracks that freight trains use. In the United States most commuter rail systems use diesel powered locomotives, but in Europe most are powered through overhead electric lines. Commuter trains operate at speeds up to about 125 m.p.h. Commuter rail lines generally are longer than other types of urban rail transit, with lengths ranging from 10 to 125 miles. Commuter rail stations tend to be spaced farther apart than other rail transit modes, with stations commonly placed at one to three mile intervals in developed areas and farther apart on sections away from city centers.

Complete Streets

A term used to describe streets that are designed for safe access and convenient use by all surface modes of travel, including pedestrians, bicyclists, public transit, and motor vehicles. The term is used in contrast to streets designed primarily or exclusively for truck and auto use. Examples of design features that characterize complete streets are well-designed sidewalks, on-street bike lanes or wide shoulders, frequent crosswalks, raised crosswalks, refuge medians, bus pullouts at bus stops with shelters and waiting areas, bus-only lanes, audible pedestrian signals at intersections, and curb extensions (bulb-outs).

Congestion Pricing

The practice of charging motorists higher tolls to use a roadway, bridge, or tunnel during peak travel periods. Tolls are varied strategically to reduce traffic in congested corridors or at congested times of day. The underlying principle is that higher tolls will encourage some drivers to travel at a different time of day or to take a different route. The dynamics of traffic congestion are such that small increases or decreases in traffic have a large impact on speeds and flow. Congestion-based tolls can be based on real-time traffic data to maintain targeted levels of service. Because tolls are theoretically used to connect the price paid to use a highway with the value of highway service, congestion pricing is also sometimes referred to as "value pricing."

Fast and Intertwined Regular (FAIR) Lanes

FAIR Lanes are a technique for addressing income-based equity issues associated with congestion pricing tolls (see Congestion Pricing) and High Occupancy Toll lane systems (see HOT Lanes). To date, FAIR Lanes exist only as concepts on paper or as experimental projects. A FAIR system would use electronic monitoring devices placed along freeways to monitor travel in "regular" lanes and in "fast" express lanes where tolls are charged. Drivers (with transponders in their cars) using toll lanes would pay tolls, while similarly equipped drivers using regular lanes would receive toll credits. Tolls in the fast lanes could vary dynamically to manage demand (see Congestion Pricing). In the regular lanes, congested flow would occur and drivers with transponders would be compensated with credits. These toll credits could be used for toll payments at other times, or to pay for transit, paratransit, or parking at commuter park-and-ride lots.

Federal Highway Administration (FHWA)

The FHWA is one of the primary agencies within the United States Department of Transportation. It is responsible for highway transportation. The FHWA administers the Federal-Aid Highway Program, which provides about $42 billion in annual funding to construct and maintain the Interstate Highways, U.S.-numbered routes, and many state-numbered routes. Federal highway funding comes primarily from the Federal Highway Trust Fund, which receives revenues from federal fuel taxes and various other federal excise taxes (truck sales, tires, etc.). The FHWA oversees federally-funded highway projects to ensure that requirements for project eligibility, contract administration, and construction standards are met.

Federal Transit Administration (FTA)

The FTA is one of the primary agencies within the United States Department of Transportation. It is responsible for public transit. The FTA administers the federal funding of local and regional transit systems through formula and discretionary programs totaling more than $10 billion annually. Federal transit funding is used to support a variety of locally planned, constructed, and operated public transportation systems throughout the United States, including buses, subways, light rail, commuter rail, streetcars, monorail, passenger ferry boats, inclined railways, and people movers.

Headway

The time interval between transit vehicles traveling in the same direction on a given route passing a specified location. For example, where buses on a route come along in a certain direction every ten minutes, that represents a ten-minute headway, which would be twice as much service as the same system operating at a twenty-minute headway. Headways vary by route, day of the week, and time of day.

High-Speed Rail

An intercity rail passenger transportation system operating at higher speeds than regular intercity rail transit (see Intercity Rail). High-speed rail (HSR) can be traditional steel-on-steel technology (steel wheels on steel rails) or can use magnetically-levitated trains. Steel-on-steel systems are generally powered using overhead electric wires. Maglev systems use a central beam below the trains both for levitation and to deliver power. The minimum velocity required to qualify as "high speed" varies internationally. In the United States, trains operating at speeds of 90 miles per hour or greater qualify as high speed, while the minimum in Europe is 125 m.p.h. The fastest systems in Europe operate up to 220 m.p.h. and in Asia up to 280 m.p.h. Test runs have been made on some systems at speeds up to 350 m.p.h.

Highway Trust Fund

The Federal Highway Trust Fund (HTF) was originally established in 1956 to provide funding for construction of the Interstate Highway System. As the federal highway program has grown, the HTF has been expanded to provide funding for the entire Federal Aid Highway program. Since 1983 there has also been a Mass Transit account within the HTF used to provide funding for public transit systems. The HTF receives revenues from federal taxes on the highway use of motor fuels (18.4 cents per gallon of gasoline and 24.4 cents per gallon of diesel fuel) as well as other truck-related excise taxes on truck tires, sales of trucks and trailers, and heavy vehicle use. At mid-decade the HTF was taking in about $39 billion annually,

but receipts have been lower since 2006, resulting in shortfalls relative to congressionally authorized funding levels. Late in 2008, Congress appropriated $8 billion in general funds to cover a revenue shortage in the HTF, and a similar amount may be needed late in 2009.

High Occupancy Toll (HOT) Lanes

When high occupancy vehicle (HOV) lanes are opened up for use by any driver willing to pay a toll, they are called HOT lanes—high occupancy toll lanes. Regular HOV vehicles—buses, carpools, motorcycles, and emergency vehicles—continue to have free access to HOT lanes, but drivers of single occupancy vehicles can also pay to use them. Tolls for HOT lanes are usually designed to vary, so that they can be set in "real time" to reflect current traffic conditions. This allows planners to regulate demand and keep the HOT/HOV system free of congestion—even during peak hours (see Congestion Pricing). Implementation of HOT lanes requires a remote sensing system for data collection and a billing system that includes transponders installed in vehicles and monitoring devices installed along or above the toll lanes.

Induced Travel

The travel or traffic that is created when additional capacity is provided in transportation networks or corridors. Induced travel is travel growth in addition to the originally forecast travel growth. The source of induced travel is latent travel demand: the travel that people would like to undertake but forego because of expected congestion and delay. In most cities today there is significant latent demand for travel, so capacity additions tend to generate increased travel, especially in peak travel periods. The induced travel phenomenon occurs in all surface transportation modes—walking, bicycling, public transit, and auto—but is an issue primarily with respect to highway traffic. Induced highway traffic can consume a significant percentage of any new capacity provided through roadway construction and thus may thwart forecasts of improved traffic conditions (reduced congestion).

Intelligent Transportation Systems (ITS)

A broad category of technical systems used in transportation corridors to improve flow, mitigate the impacts of congestion, and improve safety. Highway technologies in current use include real-time monitoring systems (cameras, traffic counters, etc.) connected to variable message signs, radio broadcasts, and Internet messaging systems. Many new cars are equipped with onboard navigation systems that connect to Internet sites providing current data on corridor congestion. Other applications include variable road tolls (see Congestion Pricing), emergency vehicle notification systems, automatic road enforcement equipment (photo radar, etc.), and wildlife-warning systems. Public transit ITS systems connect transponders in buses and trains to central computers that provide data on their location and expected arrival time via Web sites or displays at bus stops and transit stations. The type and use of ITS systems in all modes of transportation is expected to grow significantly in coming decades.

Intercity Rail

Rail passenger transportation service between cities. In Europe, some countries in Asia, and other parts of the world, dense networks of passenger rail services have been developed that include local trains, regional trains, express trains, and high speed rail (see High Speed Rail). In the United States, the primary network of intercity rail passenger routes is operated by Amtrak, the National Railroad Passenger Corporation, which is owned by the U.S. government. In some corridors, however, commuter rail services (see Commuter Rail) connect cities along a line and have begun to take on some of the characteristics of intercity rail. For intercity rail to compete with auto travel, operating speeds should average over 60 m.p.h. and stations should be located close to city centers and other destinations. Most of the world's non–high speed intercity rail lines have a corridor length between 60 and 300 miles. Services shorter than 60 miles are generally considered commuter rail systems and services longer than 300 miles generally function as excursion systems or are transformed into high speed rail systems to compete with air travel. (Excursion travel represents much of Amtrak's ridership outside the Northeast Corridor.)

Intermodal

A term used to describe transportation facilities, systems, and services that integrate multiple transportation modes. In freight transportation, the term describes facilities for transferring freight between trains and trucks, or between ocean-going vessels and ground transportation systems, or from truck and rail to river barge. Facilities where parcels are transferred between airlines and trucks are also intermodal. Rail trains carrying truck trailers on flatcars (TOFC) or container boxes on flatcars are said to be providing intermodal services. For passenger transportation, the term applies to locations and facilities where people transfer from mode to another—rail stations, transit centers, and so forth. The term is also used to describe corridors that offer more than one mode of service. A highway route with a transit system in the median is an intermodal corridor, for example. In large cities, the term is used to describe transit systems that offer more than one type of transit. Toronto's intermodal transit system includes buses, streetcars, subways, and intercity rail services, for example, and in the future will include light rail lines. Finally, the term is used in more general ways to convey the in-

tent to integrate modes. A transportation plan or a transportation funding program may be described as intermodal. The term is almost but not quite synonymous with "multimodal." The difference is that "multimodal" denotes the presence and accommodation of more than one mode, while "intermodal" implies integration and coordination among those modes. In practice the terms tend to be used interchangeably.

Light Rail (LRT)

LRT refers to a class of urban rail transit that offers greater capacity than streetcar or tram systems and is faster than them (up to 65 mph), but has less capacity and is slower than heavy rail or metro systems. The use of the word "light" is a misnomer since light rail vehicles (LRVs) are not necessarily lighter in weight than vehicles used by other modes. LRT systems draw power from overhead electric wires and operate in exclusive rights of way, although some lines may operate for short distances on streets in mixed traffic. LRT lines may use low-floor vehicles or may board from high platforms. LRVs are designed with motors in each vehicle so that they can be operated either as single vehicles or in multivehicle trains, and LRVs are generally designed with full functionality for travel in either direction. LRT stations are generally closer together than commuter rail (see Commuter Rail) or intercity rail (see Intercity Rail) stations, with station or stop spacing ranging from a few hundred feet up to one or two miles. LRT has been the most popular form of new urban rail transit in North America since the 1980s, with new systems in many U.S. cities. Light rail systems have been credited with significant urban redevelopment benefits because several of the new lines have induced significant amounts of private sector investment in "transit-oriented developments" at and around stations.

Metropolitan Planning Organization (MPO)

MPOs are urban transportation planning and policy-making agencies that are required by federal law in any city or urbanized area with a population of more than 50,000 as a condition of receiving federal transportation funds. MPOs were originally established by Congress in 1962 as a means of improving urban transportation planning. Before then, urban transportation plans were often little more than lists of projects. Some characteristics of MPOs are set by federal law, but other features vary from state to state and from city to city. Generally an MPO includes a policy body, made up of elected officials from member cities, towns, and counties and the state department of transportation (DOT), which sets policy and approves plans. Usually it also includes a technical committee made up of staff from the member cities, towns, and counties and the state DOT that meets regularly to guide the transportation planning process and provide coordination among local governments and between them and the state DOT. Most MPOs have permanent staff; in large urban regions they may have multiple departments. In some regions MPOs have been combined with regional councils of government, and in some cases MPOs may share staff with one or more of their member cities or counties. Under current federal law MPOs are given significant authority and responsibility to set priorities among transportation projects for federal funding within that metropolitan region.

New Starts

A type of transit capital project funded through the federal transit program and administered by the Federal Transit Administration (FTA). Congress created and FTA manages a New Starts Program that is the federal government's primary financial resource for participating in the capital costs of local high-capacity transit projects, including but not limited to urban rail transit projects. The New Starts Program is a discretionary program, which means Congress appropriates funds for specific projects rather than through formula grants to transit agencies. New Starts projects face an extensive set of regulatory requirements and guidelines that must be navigated over a period of years to qualify for federal cost participation. This has led some transit agencies or cities to proceed with projects that have the characteristics of new starts projects but that are built without federal funds in order to accelerate the implementation process and reduce project development costs.

Paratransit

This term has more than one common definition. Originally, paratransit meant a type of local public transit service that did not follow a fixed route or run on a set schedule. Vehicles were typically smaller than regular urban buses, using vans and various types of smaller "minibuses" to operate in corridors and service areas where ridership was not high enough to justify regular scheduled service. In recent years the term has evolved, as federal legislation has required public transit agencies to provide specialized services to persons with physical disabilities. Now paratransit is often used to describe the special services that public transit agencies and other transit providers offer to meet the needs of passengers with physical disabilities. The term is also used to describe other special services operated by social service agencies, such as shuttles serving assisted living facilities or special rural services providing access to doctors and essential services for people who cannot drive. Finally, paratransit also is used to describe the kinds of vehicles typically used in paratransit services.

Passenger-Miles Traveled (PMT)

A measure of travel volume or activity that measures the total miles traveled by passengers in one or more modes of travel. It may be stated in terms of daily or annual travel. PMT for public transit is estimated by multiplying the number of passengers on each bus or train by the average miles traveled. PMT for auto travel is similarly calculated by multiplying vehicle miles of travel in autos (see Vehicle Miles of Travel) by average vehicle occupancy. PMT is useful as a measure of personal travel that allows comparisons across routes, systems, or modes of travel.

Reverse Commute

In many urban corridors, commute travel is heavier in specific directions at certain times of day. There may be heavy traffic into a downtown in the morning, while outbound traffic flows may be heavier in the afternoon. Reverse commute describes the nondominant direction of commuter travel in a corridor or area. The concept has a number of uses. For example, most public transit systems are designed to serve the peak direction of travel demand, so reverse commute buses or trains may be needed to improve service for passengers who live in center cities and work in suburbs. The term may also be used in connection with regional growth strategies that attempt to balance the location of housing and employment to take advantage of reverse commute freeway capacity.

Small Starts

A type of transit capital project funded through the federal transit program administered by the Federal Transit Administration (FTA). Small Starts projects are basically new starts projects (see New Starts) that are smaller in scale. To qualify as a small start, the federal cost participation requested must be less than $75 million and the total project cost must be less than $250 million. Because the regulatory requirements imposed on new starts projects can be especially onerous for smaller projects, Congress simplified the project evaluation and rating process used by the Federal Transit Administration (FTA).

Transportation Demand Management (TDM)

TDM describes a wide range of programs, strategies and measures, although the term (which is interchangeable with Travel Demand Management) is most commonly used to describe techniques for reducing demand for motor vehicle travel in urban areas and corridors. In this sense TDM measures may include variable tolls (see Congestion Pricing), improved transit services, bus passes, better bicycle facilities, bike parking, preferential parking for carpools, and commuter benefits designed to encourage means of travel other than driving alone. The underlying concept is that integrated, comprehensive transportation system management requires both "supply-side" measures (e.g., highway construction) and demand-management measures (such as encouraging carpooling). Technically, the TDM concept also applies to a broader category of measures to manage the timing and amount of demand for all types of transportation service. So, for example, variable fares on transit systems designed to affect the time or direction of peak travel are a form of TDM.

Vehicle Miles Traveled (VMT)

A measure of vehicular travel volume or activity. VMT is the sum of the miles traveled by all vehicles on all routes during a day, week, month, or year. The Federal Highway Administration tracks and reports total VMT by class of vehicle and by type of roadway in its annual Highway Statistics reports, providing data on total annual VMT in the United States and in each state. Some cities estimate VMT within their boundaries annually as a measure of system performance. VMT is also estimated and reported on a per-capita basis. As a measurement of transportation performance, VMT is similar to daily traffic but takes into account trip length and thus is a better predictor of total fuel use and emissions of air pollutants and greenhouse gases. Nationally, VMT grew steadily after World War II period until mid-2006, when it began to level off, perhaps in response to increased fuel prices. Some data indicate that VMT may grow less quickly in the United States in the future because of underlying demographic and economic trends.

Frequently Asked Questions about Transportation

1. What can be done about congestion besides building more roads?

Increasing road and street capacity is just one tool available for addressing congestion.* In fact, road-building may not always be the best strategy, since in some cases it can produce enough new traffic to consume all the new capacity.** A different strategy would be to improve transit service, which not only removes traffic from streets but also allows travelers to avoid having to drive in traffic congestion. In many places it makes sense to improve walking and bicycling environments, particularly since about 25 percent of auto trips in the United States are less than a mile long. Making it possible for people to walk and bike for short trips improves quality of life and public health and increases property values.***

Some strategies don't require transportation investments in "supply" but rather focus on the demand side. Where neighborhoods are more "complete," for example, the demand for road space can be reduced dramatically. "Complete" neighborhoods have schools, shopping, and services all within walking distance of their homes. Research has shown that when residents can walk and bike to nearby schools, retail stores, and services, household driving is reduced by 20 percent or more. Another "demand-side" strategy sets tolls and other forms of roadway pricing at higher rates during peak travel periods, thereby reducing congestion in certain corridors. Finally, new tools are available that increase the information available to travelers, enabling them to use on-board navigation systems and handheld devices with Internet connections to anticipate congested corridors and choke points and find alternative routes. States and cities can make investments that provide data and infrastructure in support of these information systems, thereby improving traffic flows without building new lanes.

Notes:

* "Increasing road and street capacity" includes adding lanes in existing corridors, building new interchanges and major intersections, and building new roads on new alignments.

** This effect is known as "induced traffic."

*** Such transit and walk/bike measures are known as "mode shift" strategies because they change the mode of some trips.

Additional Web Resources:

The Municipal Research and Services Center of the State of Washington has introductory information about congestion management on its website at: www.mrsc.org/Subjects/Transpo/CongestionMgt.aspx.

A thoughtful discussion of induced traffic demand can be found on a British site: www.absoluteastronomy.com/topics/Induced_demand.

The Victoria Transport Policy Institute has a great deal of information about transportation demand management at: www.vtpi.org/tdm.

2. How are roads funded?

Each public road or street is the responsibility of a specific municipality, county, or state agency.* State highways are funded by state departments of transportation (DOTs) with money from state fuel taxes, vehicle registration fees, and other state-enacted sources.

State DOTs also receive federal funds from Congress. These federal highway funds are appropriated from sources that include fuel taxes and various excise taxes on vehicles and tires, as well as other fees and taxes.

In most states, counties and municipalities are responsible for local streets within their jurisdictions and pay for them with funds from a variety of sources including property taxes, sales taxes, real estate excise taxes, permit fees, local option gas taxes, and general funds. (In a few states, county or municipal streets are the responsibility of the state DOT.) Counties and municipalities usually also receive some state and federal funding from their state DOT. In some cases, construction of state and local roads or streets may be funded in part through tolls or through impact fees paid by developers.

Finally, some roads in national parks or forests or on other public lands are the responsibility of the federal or state agencies that manage them and that receive funding from public lands and recreation programs.

Notes:

* Some private roads and streets are built by developers and maintained by special districts or property owners' associations.

Additional Web Resources:

The National Conference of State Legislatures has a site devoted to state transportation funding issues at: www.ncsl.org/default.aspx?tabid=13606.

Congress appointed a National Transportation Policy and Revenue Study Commission to examine how transportation is funded at the federal level. The final report of the Commission can be found here: http://transportationfortomorrow.org.

The American Association of State Highway and Transportation Officials (AASHTO) maintains a "Bottom Line" website devoted to surface transportation funding issues at: http://bottomline.transportation.org/ataglance.html.

3. How is public transit funded?

Public transit systems* are funded in part through fares, passes and other direct "operating" revenues. Local or state agencies that manage public transit systems also receive funding through local or regional public sources such as sales taxes, property taxes, and other taxes and fees. Transit agencies supplement these sources with grants from state DOTs and federal agencies. In most states, state transit grants come from state general funds or a state sales tax, although in a few states public transit grants come out of the state highway or transportation fund. Federal public transit grants are appropriated by Congress from federal general funds and from the federal highway fund. It is uncommon for public transit systems to receive funding from impact fees, although some municipalities may obtain money for new buses or rail stations through exactions or special districts. In some states a state DOT or state transit agency may have direct responsibility for the operation of specific services or corridors. Finally, it is important to note that many state, regional, and local public transit providers contract with private transit companies for specific services, but that generally does not change how those services are paid for.

Notes:

* Public transit systems are owned and operated by the public through some sort of transit agency. There are also a variety of private transit systems, including hotel shuttles, airport shuttles, intercity bus companies, and various other forms of for-hire transit.

Additional Web Resources:

For a website with general information about public transit, including transit funding issues, go to: www.publictransportation.org.

The American Public Transportation Association website provides extensive information about public transit and public transit funding: www.apta.com.

The National Conference of State Legislatures has a website devoted to state transportation funding issues at: www.ncsl.org/default.aspx?tabid=13606.

Congress appointed a National Transportation Policy and Revenue Study Commission to examine how transportation is funded at the federal level. The final report of the Commission can be found here: http://transportationfortomorrow.org.

4. How are transportation and land use issues related?

Land uses generate transportation demand and transportation systems and corridors generate demand for land uses.

Land development patterns have a significant effect on travel demand. Where land uses are separated—with homes in one area and retail stores in another, for example—traffic levels will be high. Where land uses are mixed and densities are moderate or higher, transit ridership will be high. Where there is a horizontal mix of land uses in neighborhoods with a well-connected street network, walking and bicycling activity will be high.

At the same time, transportation is necessary to supporting development and redevelopment of land uses. Roads and streets and transit systems provide essential access to land. Further, the capacity and operational characteristics of streets and transit systems determine travel times in specific corridors, which in turn influence where development pressure will be focused. Transportation connects destinations together, creating economic synergies that significantly influence where employment centers and retail centers are built. Freight access determines where businesses can thrive, which in turn influences where commercial development can occur. Neither private sector investment strategy nor public policy can address these two issues successfully unless they are understood as integrated elements of urban form.

Additional Web Resources:

The website of Reconnecting America and the Center for Transit-Oriented Development (CTOD) provides extensive information on the relationship between transit and land use: www.reconnectingamerica.org.

For information about how the transportation/land use relationship influences greenhouse gas emissions and climate change, go to the "Growing Cooler" website at: www.smartgrowthamerica.org/gcindex.html.

For information about the relationships between transportation systems and urban sprawl, go to: www.smartgrowthamerica.org/transportation.html.

A Transportation Research Board report on transportation and land use in rural areas can be downloaded at: www.trb.org/news/blurb_detail.asp?id=8243.

5. What effects do transportation improvements have on real estate?

The effects of transportation investments on real estate are myriad. On the one hand, a new road or street can add significant value to property by providing the access that makes development possible. At a regional scale, investments in roadway and transit capacity influence travel times in specific corridors, which can in turn influence the development potential of sectors and regions.

On the other hand, the design and operation of transportation facilities and systems have direct effects on abutting and nearby properties. These effects may be positive, such as when a street is made more attractive with modern paving, street trees, and curb extensions, or when a new light rail station and line is built nearby. Or they may be negative, such as when a street is expanded to create a wide, high-speed corridor with few visual amenities, thereby detracting from the value of the properties along it.

Certain kinds of real estate require specific transportation improvements. Warehousing and distribution centers need direct access to freeways and rail sidings. Office parks and other employment centers need good transit commuter services. Successful residential developments need pedestrian- and bicycle-friendly streets. And downtowns and other storefront business districts need low-speed streets with plentiful on-street parking. One common rule uniting all these relationships is that when a key transportation facility is changed significantly, the abutting and nearby lands will be affected in ways that may add or subtract from the value of those lands.

Additional Web Resources:

A recent report on the impacts of transit on real estate values published by the Center for Transit-Oriented Development can be downloaded at: www.reconnectingamerica.org/public/projects/318.

The Transportation Alternatives organization in New York City recently released a report on the relationships among walking, bicycling, and real estate values that can be downloaded at: http://transalt.org/newsroom/releases/2491.

6. How does my state receive federal transportation funds?

The U.S. Department of Transportation currently distributes transportation funds to states pursuant to 2005 federal legislation called the "Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users" (SAFETEA-LU). This surface transportation program authorized funding for highways, highway safety, and public transportation totaling about $244 billion over a five-year period ending September 30, 2009, when the program must be reauthorized or extended by Congress. This money is not actually available each year until Congress passes the annual appropriation bills that determine the specific amounts to be provided in each program. Most federal highway funds are distributed to the state departments of transportation (DOTs) according to formulas and criteria in SAFETEA-LU. These funds are then either used directly for state DOT projects or allocated to local and regional agencies according to provisions in both federal and state laws. Federal public transit funds, on the other hand, are primarily distributed directly to "designated transit providers"—regional and local transit agencies. Federal funds for walking and bicycling facilities are made available to the state DOTs through allocations within the federal highway program, including the "enhancements" program, which provides significant funding for new walking and bicycling facilities.

Additional Web Resources:

Information about the current federal transportation authorization legislation (SAFETEA-LU) can be found on the Federal Highway Administration website at: www.fhwa.dot.gov/safetealu.

The Federal Transit Administration also provides a website on the current authorization and related implementation at: www.fta.dot.gov/index_4696.html.

The Iowa Department of Transportation provides a useful Web page and links with information about how transportation funds are used in that state: www.iowadot.gov/pol_leg_services/fed_trans_funding.html.

7. Who plans the transportation system?

Planning for transportation systems is carried out by state, regional, and local agencies. State departments of transportation (DOTs) have the primary responsibility for planning the state highway system, especially freeways and major arterials. Many state DOTs have multimodal transportation plans that address more than just highways, although this varies widely from state to state.

All urban areas with populations of more than 50,000 have a federally-designated Metropolitan Planning Organization (MPO) that conducts multimodal transportation planning for its area. Within their metropolitan areas MPOs have significant authority to set priorities for the expenditure of federal funds on transportation projects, including state highways and major transit projects.

Local governments—counties and municipalities—plan their local transportation systems in cooperation with their state DOTs and (if applicable) MPOs. In most states, these local governments have the primary responsibility for planning their local streets, sidewalks, and trail systems. They may also be involved in planning and delivering public transit services. In larger urban areas, however, additional public transit planning may be conducted by regional transit agencies.

Finally, in most cities organized citizen groups are involved in the planning processes for transportation and may develop plans for specific projects or corridors that they then promote to the state or to local or regional agencies. In all cases, residents have a responsibility to be knowledgeable about transportation needs and issues in their region and to be involved in the state, regional, and local transportation planning processes.

Additional Web Resources:

A "briefing book" describing the transportation planning process that was developed jointly by the Federal Highway Administration and Federal Transit Administration is available at: www.planning.dot.gov/documents/briefingbook/bbook.htm.

A useful website for one of the major Metropolitan Planning Organizations (the MPO for the St. Louis region) can be found at: www.ewgateway.org.

The Association of Metropolitan Planning Organizations' website provides information about MPOs and their activities at: www.ampo.org.

A useful website showing one example of how state departments of transportation approach the planning process can be found at: www.wsdot.wa.gov/planning/2009economicstimulusprogram.htm.

8. Are there any financial incentives to commute by transit or bicycle?

The most direct incentives are cost savings. Someone who commutes a round trip distance of 16 miles daily in a car alone (the national average) is spending almost $3,000 annually on the costs of driving to work.

Many employers also offer additional tax-free incentives. The bicycle tax credit was passed as part of the American Recovery and Reinvestment Act and became effective January 2009. This legislation allows employers to reimburse employees up to $20 per month for bicycle-commuting-related expenses. The employer can claim a tax deduction for the reimbursements. Employers may also provide workers with up to $230 per month in tax-free transit and vanpool benefits. Commuters can receive both a transit and a parking benefit (up to $460 per month). Finally, employers can allow employees to use pretax dollars to pay for transit passes, vanpool fares, and parking.

Additional Web Resources:

For information on how to calculate savings based upon trip length and frequency go to: www.smarttrips.org/transportation/savingsCalculator.aspx.

For annually updated data on the cost of owning and operating a car go to: www.aaapublicaffairs.com/Main.

For a summary of commuter tax benefits go to: www.nctr.usf.edu/clearinghouse/commutebenefits.htm.

9. Why are people talking about raising gas taxes?

Motor fuel excise taxes (or "gas taxes") include taxes on both gasoline and diesel fuel. Revenues from these taxes are a significant source of funding for federal, state and local transportation programs, especially road and street projects. Current federal tax rates are 18.4¢ per gallon of gasoline and 24.4¢ per gallon of diesel fuel. Fuel taxes also are assessed by all fifty states, with the average state gasoline tax at 28.6¢ and the average state diesel tax at 29.2¢. Some counties and municipalities also impose taxes on fuel sales.

As motor vehicle travel in the United States has reached a plateau (after sixty years of steady growth), revenues from fuel taxes have peaked. Because federal and state taxes are assessed on a cents-per-gallon rather than a percentage-of-price basis, increases in pump prices tend to drive tax revenues downward as higher prices reduce consumption. That, coupled with rapid increases in the costs of materials used in transportation projects (asphalt, concrete, fuel, steel, etc.), has caused the "real" dollars available for transportation improvements to shrink dramatically. As a result, the federal highway trust fund has not been able to meet financial obligations in each of the past two budget years and state departments of transportation have reduced their construction programs to the lowest level in decades.

The need to provide funding for transportation projects has led to calls for increases in both federal and state fuel taxes. Other arguments for higher fuel taxes include the need to encourage more efficient motor vehicles and the need to reduce greenhouse gas emissions. At the same time there is a growing interest in replacing per-gallon fuel taxes with new taxes based on actual miles driven, which would reduce the dependency of transportation programs on petroleum-based revenue sources.

Additional Web Resources:

A summary of arguments for raising fuel taxes in the United States can be found at: www.vtpi.org/tdm/tdm17.htm.

For current data on national travel trends maintained by the Federal Highway Administration go to: www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm.

For current national data on fuel use maintained by the Federal Highway Administration go to: www.fhwa.dot.gov/policy/ohim/hs06/motor_fuel.htm.

A Brookings Institution site with a long list of resources and articles on these issues can be found at: http://www.brookings.edu/topics/transportation.aspx?page=1.

10. What is a vehicle mileage tax?

A mileage tax would be used to replace all or part of the "gas taxes" assessed by the federal and state governments. Such a tax would be a "road use fee" based on actual miles driven by each vehicle, rather than on gallons of fuel purchased. The State of Oregon conducted a pilot study in Portland in 2006 and 2007 and concluded it would be feasible to implement a statewide mileage tax.

The details of potential taxing systems vary, but generally the concept is that a GPS transponder installed in each vehicle would keep track of miles driven and would exchange that data with the fuel pump when a vehicle is refueled. A tax based on miles driven would be assessed instead of, or in addition to, whatever fuel taxes remain in effect. If geographic data and time-of-travel data are collected, this method of taxation would allow fees to be set differently for travel in peak congestion periods or for travel on specific roads. Because transponders are capable of tracking travel geographically, differential state or local tax rates could be imposed.

Some are opposed to mileage taxes because they are concerned about privacy issues associated with data gathered through the transponders. Others are concerned about the cost of fitting all vehicles with transponders and converting all gas pumps to handle the computational requirements of a mileage-based tax. Still others worry that such a system would tax fuel-efficient cars at the same rate as gas-guzzling SUVs, thereby eliminating an incentive to buying efficient vehicles. Finally, economists point out that mileage taxes (like fuel taxes) affect lower-income drivers and rural residents disproportionately.

Additional Web Resources:

A recent Washington Post article summarizing the recent federal debate over a mileage tax can be found at: www.washingtonpost.com/wp-dyn/content/article/2009/02/20/AR2009022003331_2.html.

An article that provides a (favorable) review of the Oregon mileage tax pilot project can be read at: www.grist.org/article/2009-04-01-oregons-successful-mileage.

A pro and con assessment of the mileage tax can be found at: www.pennlive.com/specialprojects/index.ssf/2009/06/big_ideas_for_pennsylvania_mil.html.

11. How much more will I pay if a mileage tax is levied?

The National Surface Transportation Infrastructure Financing Commission established by Congress evaluated scenarios associated with a national mileage fee system. The Commission considered the fees that would be required for light-duty vehicles (cars, vans, and pickup trucks) and for trucks to replace current revenues from fuel taxes in the federal highway trust fund. Assuming a mileage fee was charged at a flat rate on all travel, regardless of where it occurred and regardless of fuel efficiency, the fees required to replace current fuel tax revenues would have to be about 0.9¢ per mile for light-duty vehicles and 5¢ per mile for heavy trucks. In other words, a flat 0.9¢/mile mileage tax would be about equivalent to the current federal gas tax (18.4¢ per gallon) for a vehicle that averages 20 miles per gallon (mpg). For a vehicle averaging 40 mpg, the mileage tax would be twice as high as the current tax, assuming no compensation for fuel efficiency was built into the tax rate. It is likely, though, that if a mileage tax were implemented it would be set up to reflect the fuel efficiency of different vehicles. It is also possible that it would be designed to assess higher fees for travel in peak periods or on toll roads. Finally, it is likely that such a system would be designed to increase the amount of revenue into the federal transportation program. So the average for most drivers would be higher than current fuel taxes, but also would vary for different vehicles and different drivers.

Additional Web Resources:

A copy of the National Surface Transportation Infrastructure Financing Commission report and related information can be found at: http://financecommission.dot.gov/.

12. If people can pay to use HOV lanes, won't this just benefit the rich?

When high occupancy vehicle (HOV) lanes are opened up for use by any driver willing to pay a toll, they are called HOT lanes—high occupancy toll lanes. Regular HOV vehicles—buses, carpools, motorcycles, and emergency vehicles—continue to have free access to HOT lanes, but drivers of single-occupancy vehicles can pay to use the lanes. Tolls for HOT lanes are usually designed to be variable so that they

can be set in "real time" to reflect current traffic conditions, as a way to regulate demand and keep the HOT/HOV system congestion-free even during peak hours. Historically it has been thought that HOV systems tend to benefit lower-income people because they are more likely to ride transit or carpool. In most cities today, however, commuters with wide-ranging incomes take advantage of transit and ridesharing, so the benefits are spread across income categories. Likewise, introducing the HOT lane concept would theoretically benefit people who can afford to pay the tolls, especially during peak hours. But researchers have found that HOT lane use is more a function of travel conditions and trip importance than income. A study of HOT lanes along California State Route 91 undertaken by researchers at Cal Poly San Luis Obispo found that all income categories were represented in the HOT lane traffic stream. A HOT lanes user panel survey conducted in Minnesota found that support for HOT lanes was fairly consistent across all income groups—71 percent higher income, 61 percent middle income, and 64 percent lower income. Interestingly, when asked a more specific question (Do HOT lanes only benefit the rich?), a higher percentage of high-income drivers (13 percent) than low-income drivers (11 percent) responded "yes."

Additional Web Resources:

For a website with impartial information on HOV and HOT lanes as well as numerous links to other sites devoted to specific facilities, go to: www.mtc.ca.gov/planning/hov/faq.htm.

Data from the ongoing Minnesota study of HOT lanes users can be found at: www.hhh.umn.edu/centers/slp/reports.html.

13. Have travel trends changed recently?

We appear to be entering a period of significant change in the way people travel. Annual vehicle miles traveled (VMT) increased most years between 1956 and 2004 in the United States, with growth averaging about 2.4 percent per year between 1991 and 2004. Beginning in 2004, however, daily VMT began to level off. That was followed by actual declines in VMT in both 2007 and 2008. If this trend continues, it will represent the first sustained drop in national VMT since the end of World War II.

The decline in vehicular travel may have been caused in part by rising fuel prices and by the ongoing recession, but there is also evidence that more fundamental forces are at work. These include a decline in the working-age population (due to the aging of Baby Boomers) and a related decline in the number of two-parent households with children. In addition, for decades the steady increase in women's labor-force participation was a major source of increased driving and increased auto ownership per household. That trend has peaked in recent years.

At the same time that VMT growth has leveled out, public transit ridership has been increasing. There were about 11 billion trips on public transportation in the United States in 2008, a 4 percent increase over the number of trips taken in 2007. Urban light rail systems have been especially popular, with double-digit ridership increases in cities including Buffalo, Philadelphia, Sacramento, Baltimore, Minneapolis, Salt Lake City, Denver, and Dallas. Now the restructuring of homebuilding and home mortgage markets may be leading to resurgence in urban living, with the "drive 'til you qualify" era of suburban expansion no longer feasible due higher fuel prices and changing home buyer preferences. If the far-flung suburbs turn out not to be marketable to either retiring Baby Boomers or the new generation entering the workforce, this could bring about a long-term decline in daily per-capita VMT and possibly even a long-term leveling-off of total VMT.

Additional Web Resources:

"The Road Less Traveled: An Analysis of Vehicle Miles Traveled Trends in the U.S." is available for download at this site: www.brookings.edu/~/media/Files/rc/reports/2008/1216_transportation_tomer_puentes/vehicle_miles_traveled_report.pdf.

A report on VMT trends prepared for the East-West Gateway Council of Governments can be downloaded at: www.ewgateway.org/pdffiles/library/trans/trafficvolumes/vmtrpt.pdf.

For data and trends on transit ridership in the United States, go to the American Public Transit Association's page at: http://www.apta.com/resources/statistics/Pages/ridershipreport.aspx.

For monthly reporting on the VMT trend in the United States, with data for each of the states, go to: www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm.

NAR Official Policy on Transportation

Adopted by the NAR Board of Directors on May 17, 2008

The timely provision of safe, convenient and efficient transportation infrastructure enhances the quality of communities, supports property values, and mitigates the effects of traffic congestion that accompany growth. REALTORS® support improving mobility in communities so that all citizens have access to transportation means best suited to their needs. Changing travel patterns, shrinking petroleum supplies, and continuing technological innovation will challenge traditional means of transportation planning, construction and funding. With these challenges in mind, NAR urges the federal government to incorporate the following principles in future transportation authorization legislation.

1. Federal spending for transportation infrastructure should be sufficient to maintain the current physical condition and level of performance of highways and transit systems and to make improvements to reduce congestion and to foster economic development. To finance increased transportation spending, NAR supports both a modest increase in the federal transportation user charge tax rate and indexing the tax rate to account for inflation. In addition, the federal government should explore a variety of means to ensure a reliable stream of revenue for transportation funding so that revenues grow in step with increasing travel demand.

2. High occupancy toll lanes should be permitted on roads financed with federal assistance. All tolls collected on such lanes should be dedicated to transportation purposes in the same community in which they are collected.

3. Taxes levied on transportation users should be deposited in a trust account for spending exclusively on transportation purposes.

4. Interest on balances in the Highway Trust Fund should accrue to the Fund and be spent exclusively for transportation purposes.

5. States should have a large measure of flexibility in determining how Highway Trust Fund monies are spent within their borders.

6. Highway Trust Fund revenues should continue to be used for projects designed to mitigate air pollution by reducing travel demand.

7. The federal share of funding for new transit capital projects should remain on a par with the federal share of funding for highway projects.

8. Transportation planning and implementation should be fully integrated into a comprehensive community planning effort, coordinated with state and metropolitan planning processes, using substantial citizen involvement and civic leadership to achieve the consensus vision of the community.

9. The federal transportation funding bill should provide a predictable level of funding that avoids large changes from one year to the next.

10. All federal taxes levied on any fuel or alternative energy source used for surface transportation should be deposited in the Highway Trust Fund.

11. The time required for environmental review of transportation projects should be significantly reduced without compromising environmental protection.

12. Federal Surface Transportation Programs for states should be structured so that:

    - State and local transportation planning is not biased in favor of one mode or another because of differences in federal program requirements.
    - Proportionately more funds are available in parts of a state with greater transportation needs.
    - Emphasis is placed on providing seamless connections between transportation modes.
    - Priority in spending is given to maintaining the integrity and performance of existing investments in national transportation infrastructure.

13. Transportation improvement planning should consider the needs of all transportation users along a transportation corridor and provisions should be made to accommodate a variety of users in transportation projects, where possible.